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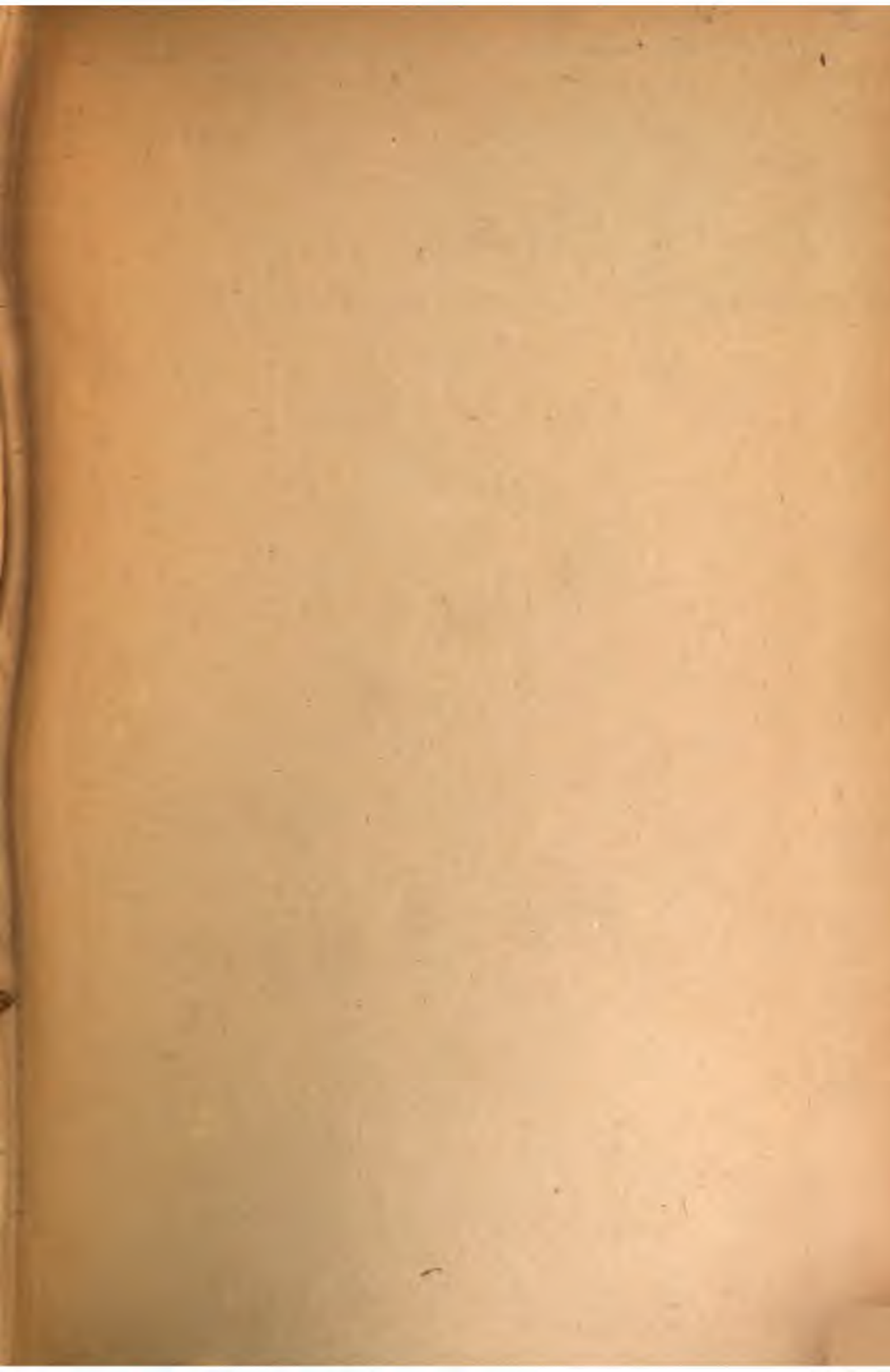
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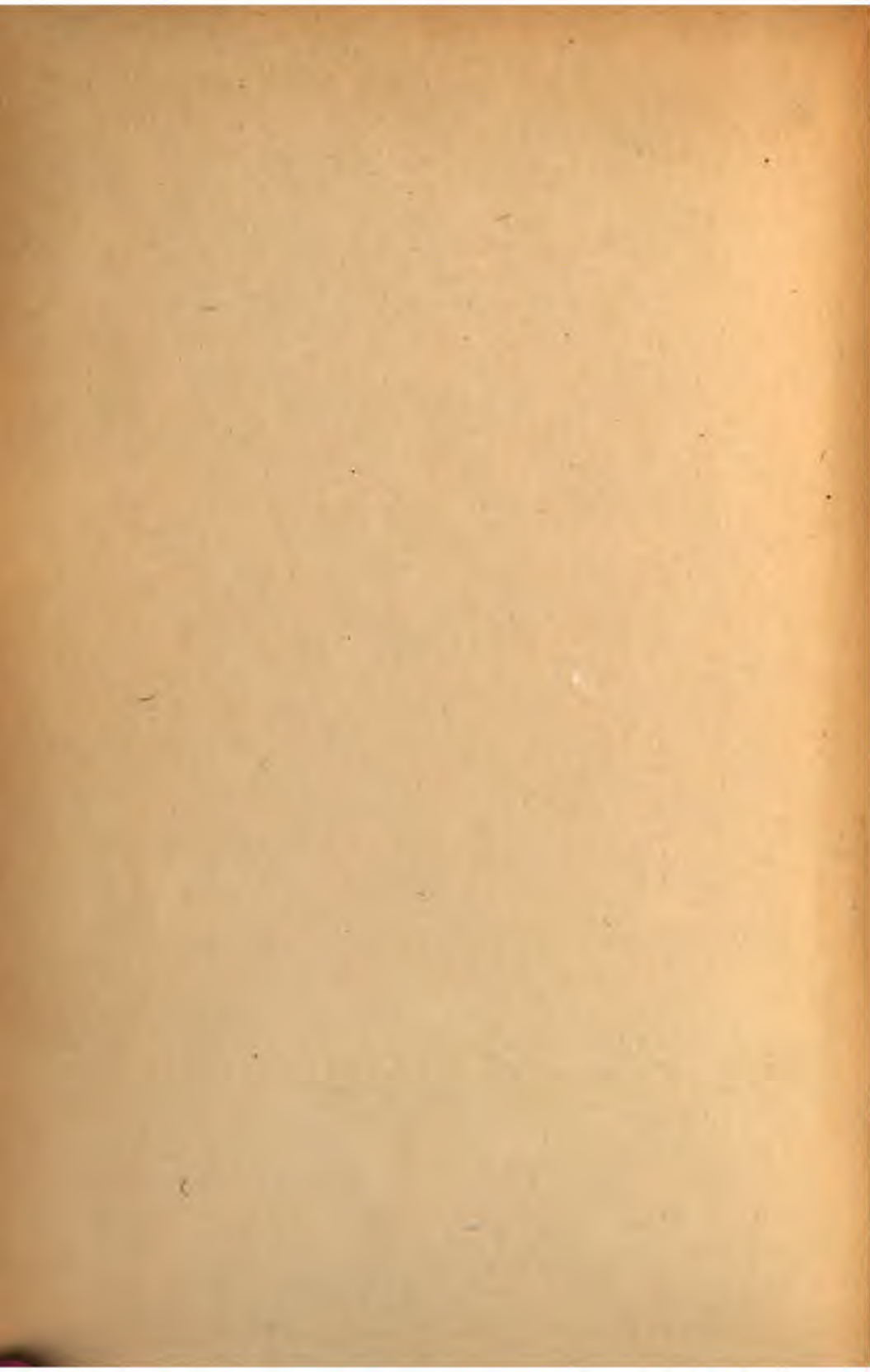
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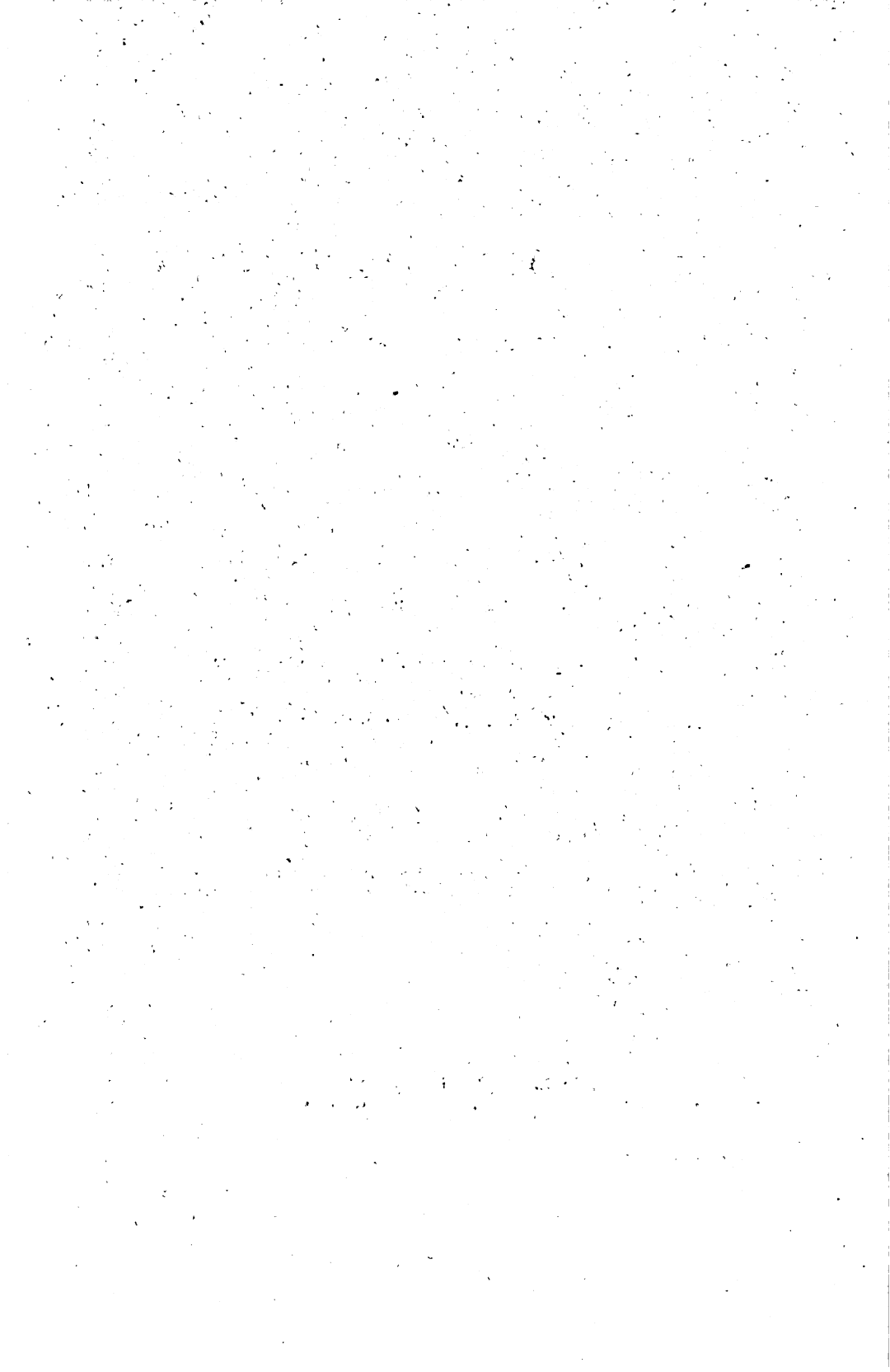
## Association of American Agricultural Colleges and Experiment Stations

HELD AT

CHICAGO, ILL., NOVEMBER 12-14, 1919

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Edited by J. L. HILLS, Secretary  
For the Executive Committee of the Association



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- TENNESSEE—THE UNIVERSITY OF TENNESSEE, *Knoxville*. H. A. Morgan, *President, Dean College of Agriculture, Director Experiment Station*; C. A. Willson, *Vice-Dean College of Agriculture*; C. A. Mooers, *Vice-Director Experiment Station*; C. A. Keffer, *Director Division of Agricultural Extension*; C. E. Ferris, *Dean College of Engineering*; Louise G. Turner, *Head Home Economics Department*.
- AGRICULTURAL AND INDUSTRIAL STATE NORMAL SCHOOL FOR NEGROES, *Nashville*. W. J. Hale, *President*.
- TEXAS—AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, *College Station*. W. B. Bizzell, *President*; E. J. Kyle, *Dean School of Agriculture*; B. Youngblood, *Director Experiment Station*; T. O. Walton, *Director Extension Service*; J. C. Nagle, *Dean School of Engineering*.
- PRAIRIE VIEW STATE NORMAL AND INDUSTRIAL COLLEGE, *Prairie View*. J. G. Osboyme, *Principal*.
- UTAH—AGRICULTURAL COLLEGE OF UTAH, *Logan*. E. G. Peterson, *President*; G. R. Hill, Jr., *Director School of Agriculture*; F. S. Harris, *Director Experiment Station*; John T. Caine, III, *Director Extension Division*; R. B. West, *Director School of Agricultural Engineering*; A. H. Saxer, *Acting Director School of Home Economics*.
- VERMONT—UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE, *Burlington*. G. W. Bailey, *Acting President*; J. L. Hills, *Dean College*

of Agriculture, *Director Experiment Station*; T. Bradlee, *Director Extension Service*; J. W. Votey, *Dean College of Engineering*; Bertha M. Terrill, *Professor of Home Economics*.

VIRGINIA—VIRGINIA AGRICULTURAL AND MECHANICAL COLLEGE AND POLYTECHNIC INSTITUTE, *Blacksburg*. J. A. Burruss, *President*; H. L. Price, *Dean Agricultural Department*; A. W. Drinkard, Jr., *Director Experiment Station*; J. R. Hutcheson, *Director Extension Division*; S. R. Pritchard, *Dean Engineering Department*.

HAMPTON NORMAL AND AGRICULTURAL INSTITUTE, *Hampton*. J. E. Gregg, *Principal*; W. K. Blodgett, 2nd, *Director Agricultural Department*; J. L. Buck, *Director Extension Work*.

WASHINGTON—STATE COLLEGE OF WASHINGTON, *Pullman*. E. O. Holland, *President*; E. C. Johnson, *Dean College of Agriculture, Director Experiment Station*; S. B. Nelson, *Director Extension Service*; H. V. Carpenter, *Dean College of Mechanic Arts and Engineering*; Florence Harrison, *Dean College of Home Economics*.

WEST VIRGINIA—WEST VIRGINIA UNIVERSITY, *Morgantown*. F. B. Trotter, *President*; J. L. Coulter, *Dean College of Agriculture, Director Experiment Station*; N. T. Frame, *Director Extension Department*; C. R. Jones, *Dean College of Engineering*; Rachel H. Colwell, *Associate Professor Home Economics*.

THE WEST VIRGINIA COLLEGIATE INSTITUTE, *Institute*. J. W. Davis, *President*; A. W. Curtis, *Director Agricultural Department*.

WISCONSIN—UNIVERSITY OF WISCONSIN, *Madison*. E. A. Birge, *President*; H. L. Russell, *Dean College of Agriculture, Director Experiment Station, Director Agricultural Extension Service*; J. A. James, *Assistant Dean College of Agriculture*; F. B. Morrison, *Assistant Director Experiment Station*; K. L. Hatch, *Assistant Director Extension Service*; F. E. Turneure, *Dean College of Engineering*; Abby L. Marlatt, *Director of Home Economics*.

WYOMING—UNIVERSITY OF WYOMING, *Laramie*. Aven Nelson, *President*; A. D. Faville, *Dean College of Agriculture, Director Experiment Station*; A. E. Bowman, *Director Extension Work in Agriculture and Home Economics*; J. C. Fitterer, *Chairman College of Engineering*; Greta Gray, *Head Department of Home Economics*.

## List of Delegates in Attendance

**ALABAMA:** C. C. Thach, J. F. Duggar, E. E. Buiford.  
**ARKANSAS:** J. C. Futrall, M. Nelson, W. N. Gladson, W. C. Lassetter.  
**ARIZONA:** R. B. von KleinSmid, D. W. Working, E. P. Tayler.  
**CALIFORNIA:** B. I. Wheeler, H. J. Webber, B. H. Crocheron, C. F. Shaw.  
**COLORADO:** C. A. Lory, C. P. Gillette, H. T. French, L. D. Crain, S. A. Johnson, A. Kezer, Inga M. K. Allison.  
**CONNECTICUT:** C. L. Beach, H. J. Baker.  
**DELAWARE:** H. Hayward.  
**FLORIDA:** A. A. Murphree, P. H. Rolfs, A. P. Spencer, C. K. McQuarrie, Sarah W. Partridge.  
**GEORGIA:** A. M. Soule, J. P. Campbell, J. R. Fain, Mary E. Creswell, H. P. Stuckey.  
**IDAHO:** E. H. Lindley, E. J. Iddings, L. W. Fluharty.  
**ILLINOIS:** D. Kinley, E. Davenport, C. R. Richards, Isabel Bevier, Mamie Bunch.  
**INDIANA:** W. E. Stone, C. G. Woodbury, C. H. Benjamin, G. I. Christie, H. J. Reed.  
**IOWA:** R. A. Pearson, C. F. Curtiss, R. K. Bliss, A. Marston, Catharine J. MacKay.  
**KANSAS:** W. M. Jardine, F. D. Farrell, A. A. Potter.  
**KENTUCKY:** F. L. McVey, T. Cooper, G. Roberts, T. R. Bryant, F. P. Anderson, Gertrude M. McCheyne.  
**LOUISIANA:** T. D. Boyd, W. R. Perkins.  
**MAINE:** Robert J. Aley, H. S. Boardman.  
**MARYLAND:** A. F. Woods, T. B. Symons, T. H. Taliaferro, F. B. Bomberger, J. W. Willard.  
**MASSACHUSETT:** K. L. Butterfield, F. W. Morse.  
**MICHIGAN:** F. D. Kedzie, R. S. Shaw, R. J. Baldwin, G. W. Bissell, Mary E. Edmonds.  
**MINNESOTA:** R. W. Thatcher, A. Boss, E. M. Freeman, A. D. Wilson, Mildred Weigley.  
**MISSISSIPPI:** W. H. Smith, J. R. Ricks, R. S. Wilson, Susie V. Powell.  
**MISSOURI:** F. B. Mumford, A. J. Meyer, Louise Stanley.  
**MONTANA:** A. Atkinson, F. S. Cooléy.  
**NEBRASKA:** S. Avery, E. A. Burnett, O. V. P. Stout, Margaret Fedde.  
**NEVADA:** W. E. Clark, S. B. Doten, J. G. Scrugham, H. P. Boardman.  
**NEW HAMPSHIRE:** R. D. Hetzel, J. C. Kendall.  
**NEW JERSEY:** J. G. Lipman, L. A. Clinton.  
**NEW MEXICO:** A. D. Crile, I. Foster, A. F. Barnes.  
**NEW YORK:** W. H. Jordan, A. R. Mann, D. J. Crosby, M. C. Burritt, D. J. Kimball.  
**NORTH CAROLINA:** B. W. Kilgore.  
**NORTH DAKOTA:** E. F. Ladd, P. F. Trowbridge, G. M. Randlett, C. B. Waldron, Katherine Jensen.  
**OHIO:** W. O. Thompson, C. E. Thorne, A. Vivian, C. S. Wheeler, E. F. Coddington, Edna N. White, G. E. Jobe.  
**OKLAHOMA:** H. G. Knight, J. A. Wilson.  
**OREGON:** W. J. Kerr, A. B. Cordley, Ava B. Milam.  
**PENNSYLVANIA:** R. L. Watts, M. S. McDowell, R. L. Sackett.

RHODE ISLAND: H. Edwards, B. L. Hartwell, A. E. Stene.

SOUTH CAROLINA: W. M. Riggs, H. W. Barre, D. W. Watkins.

SOUTH DAKOTA: W. E. Johnson, J. W. Wilson, C. Larsen.

TENNESSEE: H. A. Morgan, C. A. Mooers, W. A. Schoenfeld.

TEXAS: W. B. Bizzell, B. Youngblood, E. J. Kyle, J. C. Nagle, T. O. Walton, Laura F. Neale.

UTAH: E. G. Peterson, F. S. Harris, John T. Caine, III.

VERMONT: G. W. Bailey, J. L. Hills, T. Bradlee, J. W. Votey, Bertha M. Terrill.

VIRGINIA: J. S. A. Johnson, A. W. Drinkard, Jr.

WASHINGTON: S. C. Johnson, S. B. Nelson.

WEST VIRGINIA: F. B. Trotter, J. L. Coulter, N. T. Frame, C. R. Jones.

WISCONSIN: E. A. Birge, H. L. Russell, K. L. Hatch, Abby L. Marlatt, F. E. Turneure, F. B. Morrison.

WYOMING: A. Nelson, A. D. Faville, A. E. Bowman.

UNITED STATES DEPARTMENT OF AGRICULTURE: A. C. True, E. W. Allen, W. H. Beal, B. Knapp, C. F. Langworthy, C. B. Smith.

UNITED STATES DEPARTMENT OF THE INTERIOR, BUREAU OF EDUCATION: S. P. Capen, C. D. Jarvis, W. C. John, Henrietta W. Calvin.

# Constitution

*(As revised at Thirty-third Convention)*

## NAME

This Association shall be called the Association of Land-Grant Colleges.

## OBJECT

The object of this Association shall be the consideration and discussion of all questions pertaining to the successful progress and administration of the institutions included in the Association, and to secure to that end mutual cooperation.

## MEMBERSHIP

(1) Every college established under the Act of Congress approved July 2, 1862, or receiving the benefits of the Act of Congress approved August 30, 1890, shall be eligible to membership in this Association, provided that any agricultural experiment station not now connected with one of the above named colleges, but receiving the benefits of the Act of Congress approved March 2, 1887, shall also be eligible to membership.

(2) Any institution a member of this Association in full standing may send any number of delegates to the annual convention of the Association.

(3) Delegates from other institutions engaged in educational or experimental work in the interest of agriculture or mechanic arts may, by a majority vote, be admitted to conventions of the Association with all privileges except the right to vote.

(4) In like manner, any person engaged or directly interested in agriculture or mechanic arts who shall attend any convention of this Association may be admitted to similar privileges.

## SECTIONS

(1) The executive body of the Association shall consist of the presidents or executive officers of the institutions having membership in the Association. The executive body shall be the legislative branch of the Association.

(2) Sections shall consist of the following: A section of agriculture; a section of engineering; a section of home economics; and such other sections as may from time to time be approved by the executive body.

The sections shall communicate their recommendations and reports to the general session which shall in turn report to the executive body.

The membership of the sections shall consist respectively of the directors, deans, or other administrative heads of these respective departments or divisions of the institutions having membership in the Association and of similar divisions of the United States Department of Agriculture and the Federal Bureau of Education.

## MEETINGS

(1) This Association shall hold at least one meeting in every calendar year, to be designated as the annual convention of the Association. Special

meetings may be held at other times, upon the call of the Executive Committee, for purposes to be specified in the call.

(2) The annual Convention of the Association shall comprise one or more meetings of the executive body to which shall be referred all business of the Convention requiring legislative action.

Meetings of the sections for the discussion of matters pertaining to their respective lines of work shall be provided for in the convention program.

General meetings of the Convention shall be held as designated by the Executive Committee.

#### **OFFICERS**

(1) The officers of the Association shall consist of a president, vice-president, and secretary-treasurer, to be chosen by the executive body.

(2) Each section shall elect its chairman and secretary.

(3) An executive committee of five members shall be chosen by the executive body, of which committee three members shall be chosen from the executive body and the remainder at large.

#### **DUTIES OF OFFICERS**

(1) The officers of the Association shall perform the duties which usually devolve upon their respective offices.

(2) The president shall deliver an address at the annual convention before the Association in general session.

(3) The Executive Committee shall determine the time and place of the annual conventions and other meetings of the Association, and shall, between such conventions and meetings, act for the Association in all matters of business. It shall issue its call for the annual conventions of the Association not less than sixty days before the date on which they are to be held, and for special meetings not less than ten days before such date. It shall be charged with the general arrangement and conduct of all meetings called by it. It shall designate the time and place of the convention. It shall present a well-prepared order of business, of subjects for discussion, and shall provide and arrange for the meetings of the several sections. The subjects provided for consideration by each section at any convention of the Association shall concentrate the deliberations of the sections upon not more than two lines of discussion, which lines, as far as possible, shall be related. Not more than one-third of the working time of any annual convention of the Association shall be confined to miscellaneous business.

#### **FINANCES**

At every annual convention the Association shall provide for obtaining the funds necessary for its legitimate expenses, and may, by appropriate action, call for contributions upon the several institutions eligible to membership; and no institution shall be entitled to representation or participation in the benefits of the Association unless such institution shall have made the designated contribution for the year previous to that in and for which such question of privilege shall arise, or shall have said payment remitted by the unanimous vote of the Executive Committee.

**AMENDMENTS**

This constitution may be amended at any regular convention of the Association by a two-thirds vote of the executive body, if the number present constitute a quorum of the membership; *Provided*, that notice of any proposed amendment, together with the full text thereof and the name of the mover, shall have been given at the next preceding annual convention and repeated in the call for the convention. Every such proposition of amendment shall be subject to modification or amendment in the same manner as other propositions, and the final vote on the adoption or rejection shall be taken by yeas and nays of the institutions then and there represented.

**RULES OF ORDER**

(1) The Executive Committee shall be charged with the order of business, subject to special action of the Association, and this committee may report at any time.

(2) All business or topics proposed for discussion and all resolutions submitted for consideration of the Association shall be read and then referred, without debate, to the Executive Committee, to be assigned positions on the program.

(3) Speakers invited to open discussion shall be entitled to twenty minutes each.

(4) In general discussions the ten-minute rule shall be enforced.

(5) No speaker shall be recognized a second time on any one subject while any delegate who has not spoken desires to do so.

(6) The hours of meeting and adjournment adopted with the general program shall be closely observed, unless changed by a two-thirds vote of the delegates present.

(7) The presiding officer shall enforce the parliamentary rules usual in such assemblies and not inconsistent with the foregoing.

(8) Vacancies which may arise in the membership of standing committees by death, resignation, or separation from the Association of members shall be filled by the committees respectively.





# Proceedings of the Thirty-Third Annual Convention of the Association of American Agricultural Colleges and Experiment Stations

## MINUTES OF THE GENERAL SESSIONS

MORNING SESSION, WEDNESDAY, NOVEMBER 12, 1919

The Convention was called to order at 10 A. M. at the Auditorium Hotel, Chicago, Illinois, by the president, President Chas. A. Lory of the State Agricultural College of Colorado.

Prayer was offered by President W. O. Thompson of Ohio State University.

**THE PRESIDENT.** The first order of business this morning is the report of the Executive Committee, which will be submitted by President W. O. Thompson, Chairman.

**W. O. THOMPSON.** The Executive Committee submits the following report:

### REPORT OF THE EXECUTIVE COMMITTEE

1. The Executive Committee announces the death during the year of Presidents Brown Ayres of the University of Tennessee, and C. R. Van Hise of the University of Wisconsin and of former President J. L. Snyder of the Michigan Agricultural College. It recommends that a committee of three be appointed to prepare a suitable minute for adoption.

2. The Executive Committee announces the following invitation and recommends its acceptance for Friday noon.

CHICAGO, November 11, 1919.

TO THE SECRETARY A. A. A. C. E. S.

DEAR SIR:

We welcome the gathering in this city of your Association so closely allied with the agricultural welfare of the Nation. We believe Chicago is the logical place for you to meet at this particular time, in that this city is the center of a most important phase of agriculture—the marketing of livestock.

In the belief that a trip to the stockyards and the packing plants should be fundamentally a part of your convention, Armour and Company cordially invite you to come as our guests and to spend as much time as you choose to gain a comprehensive first-hand view of the buying transaction in the yards, the slaughtering, the activities of the Bureau of Animal Industry, cold storage warehouses and other phases of our business which help to make us of prime importance to the livestock industry.

We will esteem it an honor to entertain you, and if you can accept our invitation we will have a special train bring you out at your convenience.

You have our best wishes for a successful convention.

Very truly yours,

ARMOUR AND COMPANY,  
By J. OGDEN ARMOUR, President.

3. The Executive Committee submits the following statement concerning the financial status of the Association, and suggests that the sections on college work and administration and on experiment station work discuss

the subject and report back to the Committee in time to provide for presenting the matter for action by the Association.

The present income from dues is \$2,750. The average disbursements during the last three years have been \$3,300 or \$500 annually in excess of income. No contributions have been made to the conduct of a graduate school of agriculture during that period nor has the \$100 annual assessment for the support of the American Council of Education been paid, no bill having been presented.

On the assumption that no contribution will be sought for graduate school of agriculture activities during 1920, it is recommended that dues be fixed for the coming year as follows:

For institutions including college, station and extension service under one governing board .....	\$75
For institutions including college and extension service under one governing board .....	\$55
For institutions including neither station nor extension service...	\$35
For separate experiment stations .....	\$20

There are two institutions (Georgia and Ohio) in the second, and three (Hawaii, Massachusetts Institute of Technology and Hampton Institute) in the third category, and there are four separate stations (New Haven, Geneva, Georgia and Ohio). All others would pay \$75 annually. The present dues are: Colleges, \$35; stations, \$20. This should bring in an income of \$3,670 as against a recent outlay averaging \$3,300. No recommendation is made as to the distribution of the dues within the individual institutions as between the constituent parts, that is to say, college, station and extension service.

If it is voted to resume graduate school of agriculture activities during 1920, it is recommended that such sum as is voted for that purpose be pro rated among the institutions and added to the dues as above stated.

In case the recommendation is adopted, sectional stenographic service, if desired, could be again instituted.

4. The Executive Committee, responding to an invitation from the National Research Council, appointed President A. F. Woods of the Maryland State College of Agriculture to represent the Association at a meeting of the Division of Educational Relations held in Washington, D. C., November 5, 1919. It now recommends that a permanent relationship to the National Research Council be established and that a member of the Association be appointed to represent it.

5. The Executive Committee invites attention to the action of the Association at the last Convention (Thirty-second Proceedings, pages 124-125) accepting membership in the American Council on Education. Presidents C. A. Lory of Colorado and R. A. Pearson of Iowa and Dean Eugene Davenport of Illinois were appointed as the representatives of the Association. The Executive Committee now recommends that permanent representation be provided for by appointing three representatives for one, two and three years respectively. An annual budget of \$20,000 for five years has been pledged to the Council. Dr. S. A. Capen of the Federal Bureau of Education has been elected director and will assume his duties November 15, 1919.

The Committee recommends that the annual membership fee of \$100 be authorized and that the fee for the last and the current year be paid.

6. The Executive Committee is in receipt of a communication from the American Dairy Science Association, concerning a resolution passed by that body and "recommended" to this Association, requesting all dairy breed associations to relieve the colleges and experiment stations of the supervision of official dairy tests wherein the test period is less than ten months in length. It is the opinion of the Executive Committee that this is a local issue with each college or station and that it does not properly come to the Association. Accordingly no report or recommendation is now made touching this matter.

7. The Executive Committee announces the receipt of a telegram and other communications from B. R. Andrews, Vice-Director of the Savings Division of the War Loan Organization, proposing that this Association indorse government securities to farmers as investments. The Executive Committee has full faith in government securities and assumes that the members of the Association would join in the same faith. The Association, however, has not undertaken to be a financial adviser to farmers in such matters. The Committee, therefore, recommends no action.

Respectfully submitted,

W. O. THOMPSON, *Chairman.*

On motion, the report of the Executive Committee was received and the recommendations contained in items 1, 2, 4 and 5 were adopted.

THE PRESIDENT. Dr. H. P. Armsby of the Pennsylvania State College will now present the report of the Committee on Graduate Study.

H. P. ARMSBY. The Committee on Graduate Study respectfully submits the following statement:

#### REPORT OF THE COMMITTEE ON GRADUATE STUDY

At the outset of its report the Committee makes two recommendations to the Association.

First: Since, in the judgment of the Committee, the Graduate Summer School of Agriculture has largely accomplished its purpose of inspiring and stimulating an interest in graduate study in agriculture, and since the Land-Grant Colleges as a whole now offer extensive facilities for such study, it is recommended that the school be definitely discontinued.

Second: It is recommended that for the purpose of encouraging graduate study of agriculture, the Association award annually two graduate fellowships in agriculture, of the value of \$500 each, under the following conditions:

1. Candidates to be eligible for these fellowships must have attained the bachelor's degree in a recognized agricultural college and the master's degree in a recognized standard college or university.

2. Applications for these fellowships shall be made on blanks supplied by the Committee on Graduate Study.

3. Each application must be accompanied by five letters from former teachers of the candidate, giving information as to: (a) General scholarship; (b) proficiency in some special subject; (c) capacity for original research; (d) proficiency in writing and speaking the English language; (e) personality; (f) moral character.

The application must also be accompanied by a certified copy of all undergraduate credits and of the thesis offered in partial fulfillment of the requirements for a master's degree.

In addition, the applicant must submit a statement of the lines of study and investigation which he desires to take up. They must be strictly graduate in character, but may include work in general subjects provided it is clearly in preparation for agricultural activity as investigator or teacher.

4. All applications must be in the hands of the Committee not later than March 1, preceding the college year in which the fellowship is to be used. The fellowships will be available from September 1 of each year.

5. A fellowship may be held by the same individual for two successive years.

6. With the approval of the Committee on Graduate Study, the work may be taken at any recognized college or university selected by the student, including non-agricultural institutions, which will add to the fellowship an amount equal to that contributed by the Association.

Your Committee has also provisionally considered a plan for stimulating and assisting research work by the selection of certain research centers where investigators may be encouraged to gather for a summer vacation to pursue their investigational work under congenial and stimulating conditions.

The great benefit of such research centers as the Woods Holl Laboratories to the advancement of biological research is well recognized. The plan for agriculture would contemplate the selection of certain institutions where agricultural investigators would be likely to go for a vacation period and inducing such institutions to provide the necessary housing facilities and equipment.

The nature of many agricultural problems would, it is true, preclude the investigational work being done except locally, yet some part of many investigations may be carried out in any laboratory. If investigators in a certain subject could be led to assemble regularly at one place for a limited period, taking their work with them, their contact with each other in connection with actual research work would stimulate high ideals. An experiment station could well afford to pay all or a part of a man's expenses if he had a suitable problem and allow him to pursue his work at such a place for a limited period.

If the Association desires to encourage some such scheme, it is recommended that the matter be referred to a committee to formulate a definite plan for presentation at its next Convention.

The Committee also recommends the adoption of the following resolutions as an expression of the judgment of the Association:

*Resolved*, that, in the opinion of the Association, the provision by the constituent institutions of research fellowships in agriculture, by means of which talented and worthy students may be aided to pursue advanced graduate work, would be a significant contribution to the advancement of agricultural investigation and teaching.

*Resolved*, that in the judgment of the Association, when the work for which an experiment station assistant is employed is of graduate character and grade as determined by the faculty of the graduate school of the institution, the fact of his employment should not prevent the work from being

accepted for credit toward an advanced degree. Reasonable liberality and encouragement in this direction would not only be helpful to the experiment station, but would also be in the interest of promoting graduate study. Such liberality may be the more fittingly exercised in consideration of the fact that station employees are selected for their fitness for research and in general are superior to the average graduate student.

Respectfully submitted for the Committee,

H. P. ARMSBY, *Chairman.*

On motion, the report of the Committee on Graduate Study was received and the recommendations touching the proposed discontinuance of the Graduate School of Agriculture and the establishment by the Association as such of graduate fellowships in agriculture, were referred for consideration and report to the sections on college work and administration and on experiment station work (see pages 151 and 247).

THE PRESIDENT. I now have the great privilege of presenting to the Association the Honorable Secretary of Agriculture.

#### ADDRESS OF HON. D. F. HOUSTON, SECRETARY OF AGRICULTURE

One year ago yesterday word came across the ocean that the armistice had been signed and that hostilities had ceased. Throughout the Nation celebrations were quickly organized and the people rejoiced. And they had good reason for rejoicing; for the strong enemy of free peoples had been crushed and the wholesale destruction of human beings had ended. Doubtless few of them dreamed that at the end of a year the Nation still would not have peace. Today there is for us and other peoples neither peace nor war; and there is not only the unrest, which is the natural heritage of war, but also the uncertainty and added difficulties which exist because of the failure finally to conclude peace. Few students of history imagined when the armistice was signed that this Nation or the world would quickly return to a stable condition. History clearly teaches the impossibility of quick adjustments after great wars. The Napoleonic War was followed by a long period of turmoil; and the difficulties for half a generation after our Civil War are fresh in the minds of many of us. Still there were few of us who did not anticipate an earlier completion of the formal peace processes and a prompt exclusive devotion of governments to the work of liquidating the war.

#### WORLD IN STATE OF DOUBT

It is not my purpose or desire to attempt to assign responsibility for the delay in making peace; but I may note, as we all must, the results of the delay. The whole world remains in a state of doubt and hesitation. The people of the new nations particularly can not make their plans with any confidence, because some of them do not yet know what their alignments will be or what kind of peace will exist when it does come. With the Central Powers our commercial relations have not yet been reestablished. In them we have no consular or trade agents, while some of the Allies, having ratified the treaty of peace, are laying their plans to occupy the commercial fields of Germany and Austria and are already engaged in trade with them. The difficulties of our situation are daily brought home

to people throughout the Union, and particularly to executive and legislative officers; and the handicaps we shall suffer by additional delay are obvious. We are unable to determine the scale of our military and naval establishments, intelligently to make a financial budget, or to plan our scheme of taxation. If the League of Nations is to be a reality there is prospect of very considerable disarmament, with a consequent reduction in expenditure and taxation. It is imperative that this should occur. The war has shown clearly what military preparation means and what sort of armament we shall be compelled to maintain if a competitive military régime is to persist. Where, before the war, our military establishment entailed a burden of \$200,000,000 to \$300,000,000, it will hereafter, on a competitive basis, involve expenditures of not less than \$1,500,000,000. Further embarrassment results from the fact that there is no way of determining the duration of emergency legislation. There are statutes which expire with the proclamation of peace. This may happen in two weeks or two years, and, therefore, business men and administrative officers do not know how to make their plans and form judgments. Production programs of all sorts are fundamentally affected and disturbed conditions furnish agitators favorable opportunities for conducting their vicious propaganda. Obviously, the existing state of things makes for ineffectiveness of national life in every direction and the persistence and perhaps extension of present burdens and sacrifices.

#### UNREST LESSENING PRODUCTION

The present industrial unrest, in part a heritage of the war, is aggravated by our state of uncertainty. It is mounting higher and is crippling production at the very time when a paramount need of the Nation and of the world is a scaling down of prices and a reduction of the cost of living which, in the main, can result only from increased production and thrift. Practices are resorted to which greatly increase the already heavy burdens of industry and thwart the efforts of private and governmental agencies to furnish relief. Increased wages are demanded to meet the high cost of living and higher prices are asked to cover increased cost; and so the Nation faces a process of pyramiding, which, if not checked, will lead to industrial collapse and untold suffering. I do not undertake to pass judgment on the strike as a weapon for labor in normal times. But one thing is certain. In existing circumstances, it can only check production, lessen the volume of national wealth to be distributed, and increase the cost of living, not only for labor but for all the other citizens of the Republic. Another thing is certain. It is not a remedy to which labor ought to be forced to resort. It is a crude way of settling a dispute, as war is; and it is not creditable to us as a Nation that we can not find another and better way—that we can not establish conditions which will make a strike a thing of the past. All the people of the Nation are bearing the burden imposed by reduced production and no one class in society can hope to escape it at the expense of all other classes. "We must unite, not divide, to correct the evil." This Nation needs now to feel the patriotic impulse quite as much as it did during the war. If the preservation of the liberties of the Nation was worth fighting for, surely the opportunity victory has brought to pursue unhindered the tasks of improvement should call out

our best impulses. Peace has her need for patriotism no less intense than war; and the trouble seems to be with us, as Lloyd George said of the English people, that we have demobilized patriotism too soon.

#### EFFECT ON FARMERS

Present conditions bear with peculiar weight on the farmers of the Nation. It is not improbable that natural economic forces operating during the ensuing 12 months will produce a slow decline in prices and that, in spite of anything that can be done, the reduction may be more marked in the case of agricultural products. This may result from the fact that agricultural production during the war was not only maintained but extended, while industrial production for non-military purposes decreased in some directions; that Europe may recover more rapidly agriculturally than industrially; and that the opening up of shipping will bring back into the markets of Europe the products of more distant nations. It is reasonably clear that Europe will be hard pressed for food supplies, at least until after the harvest of 1920. Russia is likely to be a negligible factor so far as exports of foodstuffs to other nations are concerned. European countries in the aggregate probably will not produce this year more than 70 percent of their prewar normal output. Apparently Poland, Austria proper, and Italy will be in especially difficult circumstances; and all the central and western European nations will be compelled to import large quantities of cereals and meat products. The quantities they can secure will be limited, in part, by their impaired ability to pay for them. They are seeking credits not only for food supplies but also for raw materials for their industries. Obviously, they can devote only a part of the credits they receive to the purchase of foods. Unquestionably, they will attempt to obtain these in the cheapest markets. Before the European War Great Britain, the principal food-importing nation, secured most of her beef from her colonies and from Argentina. In 1913 her imports of beef from Argentina and Australia amounted to over 8,500,000,000 pounds. They decreased during the war until in 1918 she was receiving from these countries only 2,555,000,000 pounds, while, on the other hand, her imports from the United States rose in the same period from 1,462,000 pounds in 1913 to 3,583,000,000 in 1918. Shipping is opening up again and there are indications that the United Kingdom is once more turning to her former sources for supplies of beef. The exports of beef (including oleo oils) from this country to the United Kingdom during July of this year aggregated 5,300,000 pounds as against 72,000,000 in June, 1918, while the exports of pork (including lard) during July of this year amounted to 154,000,000 pounds as against 220,000,000 in June, 1919. Although the United States will be called upon to furnish Europe large supplies of food, certainly until after the next harvest, it appears that there is already a tendency for the exports of certain products to decline; and it may be, if Europe has good seasons next year, that our exports may return toward the prewar normal. We shall soon be concerned with the planting program of our farmers for the spring of 1920. In view of all the circumstances, it seems that it would be wise for the same suggestion to be made to them as was made in the early part of the year, namely, that they should practice safe farming, returning to a balanced agriculture and to the operations best suited to their own individual and community conditions.



While economic forces may be the main factors in reducing the prices of farm commodities, they will not be obvious to many people; and there will be a disposition to attribute any drop in prices to the action of Government or of private agencies. The impression seems to have got abroad that the Government was concerning itself only with the prices of foodstuffs and that the farmer would be hit first and exclusively. That such was the Government's intention is, of course, far from the truth. Its object was primarily to prevent profiteering in all the necessities of life and it is as much concerned in preventing profiteering in manufactured products as in food products. The Attorney General, in seeking power to deal with the problem, asked Congress to extend the control act to cover manufactured necessities, which was done, and has instructed his agents to give special attention to dealers in such commodities.

#### EVERY PRODUCING CLASS MUST DO ITS PART

The trouble is that the press in discussing the cost of living thinks almost exclusively in terms of food and limits its statements principally to such products. The difficulty has been increased by the fact that not a few business men have asserted that the cost of living can not be reduced unless the prices of foodstuffs fall, and that the prices of foodstuffs will not fall unless there is greatly increased production. Obviously, it is useless and unjust to ask farmers to increase production, buying what they have to buy at the present scale of prices, with the intimation that, at the end of the crop year, their products will fall in price and that then the manufacturers will consider what they can do in respect to their products. Certainly it is desirable to return to a stable condition at as early a date as possible. Every class of producers in the country must do its part and manufacturers should be willing to make at least a contemporaneous reduction in the prices of their products.

#### SOME PREREQUISITES FOR RURAL CONTENTMENT

Many people ignorant of rural problems talk and write as if farming were not a business and as if food production did not involve the expenditure of capital and labor. The demand of the city is for cheap food and that more abundantly. There are those who talk as if there could be an unlimited number of farmers. This may have been true when the farm was self-sufficient and produced little or no surplus. But, obviously, today there should be, and, in the long run, there will tend to be, enough farmers to produce their proportion of what the world will buy at prices which make production profitable. Certainly farming must pay. There will be farmers enough if the business of farming is made profitable and if rural life is made attractive and healthful. The farmer, as well as the industrial worker, is entitled to a living wage and to a reasonable profit on his investment. He is entitled also to satisfactory educational opportunities for his children and to the benefits of modern medical science and sanitation. When these requirements are met there will be no difficulty in retaining in the rural districts a sufficient number of contented and efficient people. What we need is not back-to-the-land propaganda, but an acceleration of the work for the improvement of the countryside which will render the abandonment of farms unnecessary and the expansion of farming inevitable.

I am sure that the farmers of the Nation are perfectly willing to do their part in producing and saving if all other producers in the Nation will set about doing their part.

#### NEED FOR FRESH RURAL SURVEY

Present conditions, and particularly present states of mind, indicate the need of a fresh, broad survey of rural life, of its special problems, and of its relationships. It should be viewed as a whole. A comprehensive flexible program should be developed for the guidance of the different agencies, each of which has its peculiar functions and responsibilities. Furthermore, the principles and purposes governing agricultural life and agencies should be set forth for the education of the American public, particularly the urban part of it. The Nation as a whole needs a fuller appreciation of its basic industry, and a more definite sense of direction of its efforts to foster it. Many agencies are now following more or less well-defined, helpful plans of their own devising, but these are at best piecemeal, and there is confusion of leadership and objectives. A program made by any one element would be partial and unsatisfactory. We should have a meeting of minds of all those directly concerned, of farmers, of agricultural leaders, and of business men. This need was ably presented by your former president, Dean Davenport and by Dr. Butterfield, and I need not enter into details. My present suggestion is that there should first be held a relatively large conference, and that the matter of setting up a small temporary or permanent commission be then determined.

The calling of such a conference is very definitely in the President's mind. In connection with the recent industrial conference, he authorized me to make it known that he intended to ask for another meeting which would deal especially with problems which more intimately concern farmers. The industrial conference was expected to consider only the problem of the relation of employers to employees in manufacturing, and he invoked the aid of six agricultural representatives to assist in its solution, deeming this number adequate in the circumstances. The conference now suggested would, of course, call for a very generous representation of farmers and agricultural leaders.

#### SERVICE OF COLLEGES

I keenly recognize that the Agricultural Colleges of the States, like the Federal Department itself, are now confronted with unusual difficulties and are laboring under serious embarrassments; and yet in the midst of these they are called upon to render even more urgent service. I have long had an exalted opinion of the value of these institutions to our democracy. Recent events have caused me even more highly to prize them and more clearly to recognize their need. They have made it singularly clear that agricultural institutions must omit no step to add, through research and experiment, to the sum of our scientific knowledge. In some instances, available information has proven to be fragmentary. In others there were no results at hand on which to base intelligent conclusions. Up to a short time ago investigation had seemed to run ahead of facilities for conveying information; but with the improvement in publication activity, the expansion of the agricultural press, and particularly the firm establishment of the ex-

tension service, the danger is now rather that our teaching may outrun the accumulated stock of knowledge and become sterile. Of course, neither the problems of production nor those of distribution have been solved. As economic conditions change and become more complex, new and vital research problems will arise. The Nation should have a well-balanced program not only of instruction but also of research. To this end, it must secure and retain the services of its most talented scientific and practical men; and this means something in terms of dollars and cents. It means that we must not only place the investigator on a higher financial plane but also give those who have talent funds and facilities in generous measure. It is increasingly clear that, in all positions of responsibility, the State and the Nation must be prepared to secure and retain men of the requisite training and experience and to make the conditions sufficiently attractive. Our democracy is today threatened with inefficient service because of its failure to provide a reasonably decent compensation for men of capacity charged with large responsibilities, and our democratic arrangements may either break down or result in commonplace performance, if reasonable requirements are not met.

#### SAFEGUARDING DEMOCRACY

But the Agricultural Colleges of the country owe a duty outside their technical field, outside their fields of investigation and technical education. They are charged, as I conceive it, with something more even than the task of improving farming. Present conditions point to the need of leadership along broader lines in rural as well as in urban districts. We can not too frequently refresh the minds of all our people as to the nature and meaning of democracy, of our governmental institutions and ideals; and there is in rural districts, as well as in urban, a considerable body of people, many of them recently come among us, unacquainted with our institutions and purposes, familiar only with conditions radically different from ours, who certainly need a sympathetic induction into American life and the most energetic assistance that all our educational institutions can furnish.

Some of them need more than this. They need to be taught the very elements of democracy and the meaning of the rule of law. The people of this country are committed to the rule of the majority and to the rule of law. There is no good cause which can not get a hearing from our people. It is the privilege of men who advocate it to persuade the majority that they are right. If they can, they can secure what they seek at the polls. If they can not, they must abide by the will of the majority or suffer the penalty. Not to do so is treason to the majority. The majority will not tolerate any effort of a misguided minority to impose its will by violence. It does not intend to live under the spell of threats and menaces. And the average American will not be patient with those who say that if they do not like a law they may not obey it.

#### NO CLASS RULE

Nor will the American people have any patience with those who advocate the dominance or rule of any class. Democracy arose on the downfall of a class. Our forefathers did not want class rule. They deposed such autocrats as the Stuarts, the Bourbons, and their adherents, who sought

to tyrannize over the masses. There is no one class in society that has sense enough to rule all the others. Any one class would make a sad failure of governing this Nation or any other. History teaches that lesson very plainly. I am in favor of improving our Government whenever the need for improvement is demonstrated, but not of upsetting it. There will and must be changes, but these changes must be discussed and made according to the processes of law and of American life and institutions, and not according to the whim of some class. The American people are still committed to the theory of representative government, of government made up of representatives of all the people. I do not believe they will substitute for it representation of groups of interests, with a struggle on the part of each group to dominate; and I think that they will not accept the theory that employees of the Government, municipal, state, or federal, may strike to secure what they wish. I am unable to see how a group of individuals can claim the privilege of striking against the body politic without arrogating to itself the position of supremacy over the people. It is time for very plain speaking and for the inculcation of some very commonplace truths. We are all in sympathy with rational proposals for the improvement of the masses of the less fortunate people of the Nation and of the world, but this improvement must come by orderly processes. And we must recognize that, after all, the real progress of humanity is slow. In times like these, progress is rapid, but not so rapid as it seems to some. During great upheavals, people have not infrequently thought that they have got very much further than they actually have. They have got more out of the experience than there was in it. France did this at the end of the eighteenth century, when she enthroned reason, and thought that she had got, in a few years, to a point she has not yet reached. Russia is now making the same blunder.

#### STANDARDS OF CONDUCT

What we need is cool judgment, open minds, regard for facts, and courage to follow conclusions based on them. These characteristics the institutions of learning of the Nation are peculiarly fitted to inculcate. Let us have debate, criticism, and progress by all means, but let us have constructive criticism, and let us have progressives who know where they are headed and why. Let us demand that our public men and the agencies whose task it is to inform and lead public opinion, shall show a conscientious regard for facts and give the people helpful interpretations of them. This is no time for mere partisan tactics, for personal abuse, and for misrepresentation of men, policies, and institutions. Men of any party in responsible positions, or of the press, who make statements which they know are not true—or, what is quite as pernicious and more common, statements they do not know to be true—only contribute to the spirit of unrest and irritation and tend in no small measure to furnish justification to ignorant or evil-minded persons among us for their acts of violence and crime. They assume a grave risk and will not escape their share of responsibility for what may happen.

I confidently call upon the universities and colleges here represented more energetically to lead the educational forces of the Nation in the patriotic task of keeping before the minds of all our people the meaning and value of our institutions, of Americanizing our population of recent

foreign extraction, of strengthening our useful national habits of thought, and of holding our publicists and public men to high standards of utterance and action.

**THE PRESIDENT.** Colonel F. J. Morrow of the War Department will now discuss with us the military situation as it exists in our institutions.

#### **THE RESERVE OFFICERS' TRAINING CORPS**

**BY COL. F. J. MORROW**

In accepting the invitation of this body of college executives to discuss that phase of your work with which I am connected, I can not but feel that both the privilege and the occasion are singularly opportune. In many of the institutions represented here today are to be found sections of the Reserve Officers' Training Corps, which stand foremost in the ranks of that system for efficiency and high standards. Thousands of your graduates won commissions in the recent war, and many of your present students are today preparing themselves for future service in the commissioned grades of the Reserve Corps. Most of the Agricultural Colleges are of the land-grant type, and it has always been to the institutions of this character that the War Department has looked for strong support in its program of collegiate military training. Throughout my connection with the R. O. T. C., I have invariably found in the governing authorities of your group, a spirit of sympathetic, public-spirited, patriotic and broad-minded cooperation in the attempts of the War Department to place military training on a substantial and enduring foundation. I trust that we have now completed the most difficult portion of that task and that the subsequent labor of finishing the structure will proceed smoothly, naturally, and to the satisfaction and benefit of the students, the institutions and the Government.

In the supervision of this work, we have found that there is a very human and personal element in the relations of the army authorities to the institutions, which must be fostered if these relations are to be maintained harmoniously. It is because of this fact that we welcome every opportunity to meet personally with the gentlemen who govern the institutions, to take up with you directly the problems involved in the work and to seek the wise counsel and ready sympathy, the understanding and encouragement which we value and have learned to expect from you. I have no intention, this morning, of preaching to you the doctrine of military training. I feel that we are already in accord on the merits of that question. Those of you who have the R. O. T. C. in your midst are alive to its possibilities and its benefits, and are concerned, as I am, in the question of how to improve its operation and expand its influence. One year has elapsed since the thunder of our guns on the Western Front died away with the signing of the armistice, and since that day, some 4,000,000 young soldiers have returned to their homes, their studies or their work. It was to be expected that these citizen soldiers, once out of uniform, would put behind them all thought of things military in their satisfaction of once more taking up the threads of their prewar existence. We are a peaceful and unmilitary nation, our youth are naturally averse to the discipline which the military life demands; but we know that beneath an exterior sometimes inclined to be flippant and careless, the young American con-

ceals a very sound common sense and a very deep-seated and inspiring patriotism. It is this common sense and this patriotism which has brought to them the appreciation of the necessity and the desirability of combining with their academic and professional education the willing study of military science as a preparation for national service should the occasion arise again.

In speaking yesterday before the National Association of State Universities, I took occasion to voice my convictions that military training in our colleges should properly be considered as an integral and necessary part of the curricula, and that participation in the military feature of education should be regarded by the student as much a *sine qua non* as his work in mathematics or English. Experience has proven conclusively that in those institutions where military training is compulsory it is always most successful. By the Draft Act, we established once and for all the great democratic principle that in time of war service must be universal and not voluntary. Is it not just to draw the corollary that in peace the training for war should likewise be universal and compulsory; that in the making of the young officers who are to lead our armies in battle, we should train all of that class from which these officers are to be drawn—the educated men of the Nation?

As the present laws stand, the R. O. T. C. is the most effective means provided for the maintenance of the Officers' Reserve Corps which should supply the officers for any large army that the future may require. The men who have had active experience in this world's war are enrolling in the Officers' Reserve Corps in considerable numbers. Assuming that their average period of future usefulness will continue 10 years, we see that by 1929 a source for the yearly replacement of the corps must be provided, as there will then be few or no available members who are survivors of this war.

Congress has provided that the total number of reserve officers that can be secured from the R. O. T. C. is limited to 50,000. Taking 10 years as the average period of continued usefulness of each member, 50,000 must be furnished every decade, or about 6,000 annually, allowing for natural casualties. These must be distributed amongst all the arms of the service for which the R. O. T. C. units can be practically organized. The War Department has, therefore, tentatively stated, awaiting further experience, that it is desirable to organize such a number of the various units as to secure each year the following numbers of officers:

Infantry, 2,400; field artillery, 1,080; coast artillery, 840; cavalry, 540; engineer, 360; motor transport, 360; signal, 180; ordnance, 120; tank corps, 120. Medical officers, judge advocates and adjutants general are not included in these calculations, as there have been no units organized for those services.

It is easy to see, in view of this statement, that the War Department regards the R. O. T. C. system seriously, and is thoroughly alive to its possibilities.

Permit me to remind you of the great importance that the Secretary of War attaches to the work that your institutions are doing in their support of military training. In an address delivered at Lehigh University on September 24, he said, referring to the R. O. T. C.:

"It is to the collegiate institutions of the Nation that we must always

turn to supply the material from which the commissioned officer personnel for our immense armies must be developed. More than 50,000 of our army and navy officers in this war were drawn from 150 institutions of learning. And at the early training camps for officers, there was evident one very striking fact, that the young men who had come from the schools and colleges where military training had previously prevailed were the men who most quickly and readily became available for active and efficient service." And then, referring to his visit to Lehigh University, he added, "The purpose of my coming here is to assure you that the War Department is most earnestly supporting the cause of military training in the scholastic and collegiate institutions of the country today."

There are 68 land-grant institutions; 51 for the white and 17 for the colored race. Military training is offered in 60 and is compulsory in 52 of these colleges, being required for two years in 29, for three years in eight and for four years in nine instances. Information is indefinite in six cases.

The distribution of training amongst the institutions of your group is as follows:

Infantry units, 60; field artillery units, 12; coast artillery units, 8; engineer units, 8; signal corps units, 5; cavalry units, 3; ordnance units, 1; with a total of 97 units.

Reports now being received and tabulated, indicate that the enrollment in the R. O. T. C. this year will pass well beyond the 100,000 mark. The War Department has been much embarrassed in its attempt to make the limited number of officers available under the law satisfy the increasing demands on the part of the institutions for instructing personnel. We have today approximately 400 officers on college duty. A thousand officers and 3,000 non-commissioned officers are required for the work.

The subject of R. O. T. C. credit for military service performed by students during the World War has been of much concern to you. The War Department has gone as far as it could administratively toward permitting such credit, in so far as it does not involve the question of commutation of rations. That item, of course, is regulated by law and only Congress can extend the terms of its payment. The Military Committee of the House of Representatives favorably reported House Joint Resolution No. 212, which now awaits action. It provides that credit shall be given as for service in the junior or senior divisions of the Reserve Officers' Training Corps to any member of these divisions for periods of training in active service in the Army of the United States, or for intensive training under the supervision of the War Department, or to any student who shall have pursued a course of military training in any organization authorized by any law of the United States, the amount of such credits to be determined by regulations to be prescribed by the Secretary of War.

The results obtained at the camps this past summer may be of interest to this Association.

Six infantry and one coast artillery camp were held. The total enrollment was about 3,300. Sixty percent came from the senior and 40 percent from the junior units. Thirty-three percent of the seniors were members of the advanced course. It was recognized beforehand that this was not a normal year and that a large attendance could not be obtained. It is believed that a satisfactory number from the junior units will always attend, but the enrollment in the senior units is the uncertain and serious

factor to the War Department. The camp for the basic course is optional, but the one prescribed in Special Regulations No. 44 (1919) for the advanced course is compulsory. What the effect will be on the enrollments for the advanced course, is a matter of much concern. I am anxious to learn your opinion on this point. Is the camp requirement in the advanced course likely seriously to reduce enrollments in that course? Pay was not allowed for this year's camp, and it is not desirable that the Government inaugurate that method of attracting students, if it can be avoided. Next year's camps will be similarly conducted. We hope at their close to be able to draw conclusions as to the attitude of the older students toward camp training.

The experiment was made at these camps of holding courses in teaching for the officers on college detail in order to enhance their value as instructors. A leading educator visited each camp and lectured on pedagogy. I should like to secure from this Association suggestions that will help us to improve the teaching technique of the professors of military science and tactics. Could not each institution help its own officers? The summer camp offers our only opportunity to assemble any material number of these instructors and we wish to offer them helpful suggestions at that time.

In connection with the subject of camps, permit me to mention the military camps conducted by institutions and cities. Chicago held a most successful eight-weeks summer camp at Muskegon, Michigan, called Camp Roosevelt. Attendance was optional for periods of two or more weeks at a cost of a dollar per day, per student. A military high school was one feature. It had a full faculty, held half-day sessions, lasted four weeks, and was pronounced a genuine success. San Francisco held a less pretentious camp and Columbia University conducted one on its own land in Connecticut.

Educational institutions which have an army officer on duty are authorized by law to receive camp equipment. These are not R. O. T. C. camps and the Government does not furnish rations, transportation, uniforms, etc. Their general conduct, management and financing rests with the schools and colleges. Chicago interested a group of public spirited citizens who took care of the overhead expenses, cost of construction, etc. It has made a splendid start on a fixed permanent camp equipment which the city proposes to increase and utilize each summer. This scheme seems to offer a possible solution of the problem of the profitable employment of students' summer vacations. An appropriation has been asked of Congress wherewith to conduct civilian training camps during the coming summer, but the details are not yet fully determined.

Those of you who maintained S. A. T. C. units during the war, will remember that a considerable number of students entered that body, participated in its activities and, later, discovered that through no fault of their own their legal induction was not completed prior to the signing of the armistice. Because of this fact, they could not legally be considered as having been actually soldiers of the Army and were debarred from the enjoyment of the privileges granted to regularly discharged men. This included an honorable discharge, the bonus of \$60, the right to receive and to wear the Victory medal, etc. The War Department early recognized the injustice to these young men, who served in good faith and whose incomplete induction was caused by circumstances over which they had no



control. Legislation to grant them full recognition and to correct their military records is now pending before Congress and favorable action is hoped for at an early date.

I wish to assure you that those engaged in the administration and supervision of the R. O. T. C. in the War Department deeply appreciate the support and cooperation which has been manifested by your institutions during the past year. Its conduct requires the most complete cooperation on the part of the Government and the colleges if the R. O. T. C. is to succeed. Neither party can make it prosper without the other. We are partners in an immense enterprise, which has for its object the welfare of our country.

A. F. WOODS of Maryland. Many of our students need to earn money during the summer months wherewith to defray their current college expenses. This is the chief objection to the proposition of the summer camps.

COLONEL MORROW. Will the requirement of camp attendance for six weeks during the summer prove a deterrent to any considerable number of students who normally are eligible to the advanced course? Two questions confront us: Should we eliminate summer camps on the ground that students cannot afford to attend them or should we lengthen the time of summer camp training to eight weeks?

This year's enrollments in the advanced courses are very small. For example, only 25 or 30 out of 300 eligible students in a large Texas college pledged themselves to the advanced course. They balked at the summer camp. If I could secure an expression of opinion from this Association on this point it would prove helpful. If we must pay students to attend summer camps we well may pause. Congress will hesitate a long time before it inaugurates the policy of paying thousands of students each summer to do camp work.

W. E. STONE of Indiana. It is not entirely a question of pay. Ninety percent of our students seek summer employment along the lines of their courses of study as a training for their future lines of work.

COLONEL MORROW. Does the compulsory feature of the six weeks' camp serve as a deterrent to membership in the advanced course?

(A show of hands being taken, the consensus of those present indicated a belief that the camp acted as a deterrent).

COLONEL MORROW. This is extremely discouraging. The question is how can we get the students to the camps? Shall we eliminate the camps? Assuming that we believe camp training desirable, then the question is, would pay attract the men? How much should be offered? Would the basic pay of a soldier, a dollar a day, be sufficient? Would \$50 a month be required?

A. D. CRILE of New Mexico. The student's chief objection to summer camp work is that it is out of harmony with what he expects to do in his life work. Juniors may go but the incoming seniors will not.

W. J. KERR of Oregon. Two things seem involved. In the first place, the compensation received during the training period is inadequate for the reason that the students lose the opportunity of profitable employment during the entire three months' vacation period. Many college students

make from \$75 to \$150 a month during the summer provided they are able to go to work promptly at the close of the college year and continue therein until the opening of fall term. A six weeks' summer camp practically deprives these men of all opportunities for vacation employment. Then in the second place students enrolled in engineering or other technical courses engage in actual field work during the summer. Such work is of great value to them. It is an essential part of their training. Now while these men are interested in military work they realize that when they engage in it they are preparing for an uncertain future, whereas in their regular courses of study they are preparing for their future professional careers. Anything which will tend to deprive them of the opportunity during vacation to do work along the line of their chosen profession involves too large a sacrifice.

K. L. BUTTERFIELD of Massachusetts. May I make a somewhat general suggestion? I see two reasons for the conditions which I believe exist. In the first place, general interest on the part of our students in military training is now at a low ebb. There is a reaction from war itself. Many of them participated in warfare and are sick and tired of the whole proposition. Then in the second place, there seems to be little or no correlation between the proposed military training at our colleges and any permanent national military policy. I feel that we ought not to generalize as to a long term policy until matters have straightened out again and that we should not attempt to crowd military training too fast or too far in our colleges. I feel that when we have adopted a consistent national military policy and our boys themselves have had time to get mentally straightened out again, we then may consider many details and determine many matters of policy which for the present may well be discussed but not settled.

T. D. BOYD of Louisiana. To what extent may our students elect the advanced course without signing the agreement with the War Department? May students enter upon it without agreeing to attend the summer camp and, of course, without receiving commutation of subsistence, etc.? May the colleges give military training to non-R. O. T. C. men, affording them an opportunity to decide between the beginning of the junior and the end of the senior year, whether or not they shall become regular R. O. T. C. men? Many students are not in a position at the close of sophomore year to pledge themselves to two years of additional R. O. T. C. work under the War Department agreement. There is no doubt that the Land-Grant Colleges may of right offer military training to men who are not R. O. T. C. members. The question is, however, whether such men can take the advanced work similar to that given in the R. O. T. C. without pledging themselves to attend summer camps and without receiving emoluments.

COLONEL MORROW. The attitude of the War Department is one of great liberality and flexibility. However, it is not possible under the terms of the federal law to support any student not an official member of the R. O. T. C. or give him any definite status in the R. O. T. C. unless he officially identifies himself with that particular unit. A junior or senior might be permitted to take the advanced course as a volunteer but he could not receive a uniform or commutation of subsistence nor could he receive military credit.

I believe that if this procedure were permitted to any considerable degree, the War Department would be forced to change the conditions of the advanced courses. Many students might wish to take some military training and at the same time avoid the obligations, in which event complications would surely arise. I fear that very few would pursue the full course if they were not bound in some way.

EUGENE DAVENPORT of Illinois. I am much impressed by the point of view set forth by President Butterfield. I would go further and state that a large share of our present students have had experience with military service in the Army, some in this country and some across the water. As a class, they feel that they have done their duty, that they have discharged the obligation which rests upon good citizens to aid their country. With such a feeling upon the part of our students we will be seriously handicapped if we now endeavor to establish a settled policy as to military affairs.

W. E. STONE. We recognize the force of what Colonel Morrow has said and appreciate his position. He is trying to save something out of the situation and to carry on into the future. Unless something is accomplished now there will be much less likelihood of anything being done in the future. We sympathize with the War Department people in their efforts to establish some permanent and useful form of military instruction in our institutions. But when we say that our students will not perform, except under such conditions as have been set forth, we are simply stating a condition with which we have to deal and which we personally regret. I feel that the establishment of the R. O. T. C. on a permanent basis in our institutions at this time is an important matter and that if it is not done shortly, we soon will have no effective military organization in our colleges, for interest is bound to die out, indeed it is dying out daily.

Consequently, I move that this Association express its earnest desire to continue to cooperate with the War Department, in so far as it is possible, in establishing a permanent military organization in our colleges on an effective basis.

The motion, having been duly seconded, was carried.

R. A. PEARSON of Iowa. I am impressed by what Presidents Stone and Butterfield have said. There is certainly no keen desire on the part of many students to enter upon military work; yet we, as college administrators, desire to keep it at a high level. Colonel Morrow has said that it would take much money if the men who go to summer camps are paid. Now if much can not be secured, might not less be used to pay a smaller number of choice men? Were it not better to send the best to the camps at a fair compensation rather than a larger number at a moderate compensation? If we cannot send 15,000 because of lack of funds, may we not send 1,500?

A DELEGATE. We have three commissioned officers at our institution. They are allowed to teach military tactics only. It is almost impossible now to secure teachers. Might not the laws or regulations be so changed that military instructors could be allowed to teach subjects other than military science, mathematics, for example?

J. G. LIPMAN of New Jersey. Would it be practicable to do camp training work during the winter, during the Christmas vacation for example?

If it were possible to allow students thus to make use of these two weeks with credit and they were located in a suitable winter climate, the difficulty in some measure might be overcome. Many of the students are needed during the summer on the home farms who might spend a winter month in camp in the South. The question of compensation would then become entirely secondary.

**COLONEL MORROW.** The War Department does not wish to be arbitrary in such matters. It is for college executives to say whether or not the use of the Christmas period for this purpose would be feasible. I very much doubt if we could get sufficiently satisfactory results at that season.

**E. F. LADD** of North Dakota. Fully 75 percent of our students who are eligible to the R. O. T. C. can not join it for the reason that they are required at home during the summer months. They have to work during the summer in order to secure funds wherewith to pay their way through college. Half of those who have signed up are trying to find some way in which to get out, having entered without careful consideration. In fact, some of these students have not returned to college this year feeling that it would be impossible for them to attend both college and summer camp.

**COLONEL MORROW.** Pressure has been brought on the War Department in favor of students who failed in their induction into the S. A. T. C. It rests with the institution in each case to complete the proof of the right of the students to induction. May I ask whether there was any considerable number of students who failed of induction in the S. A. T. C. in the institutions represented in this Association?

(A small showing of hands was made.)

On motion, Colonel Morrow's address was referred to a committee consisting of Presidents W. J. Kerr of Oregon, R. A. Pearson of Iowa, W. E. Stone of Indiana and S. Avery of Nebraska for further consideration and report (see pages 140-141).

**THE PRESIDENT.** The Treasurer's report will now be presented by Dean J. L. Hills of the University of Vermont.

#### REPORT OF THE TREASURER

January 8, 1919 to November 12, 1919

##### RECEIPTS

To balance on hand, Baltimore meeting .....	\$ 917.81
To underpayment voucher No. 524 of 1917-18 .....	0.06
To 50 dues from colleges at \$35 .....	1,750.00
To 51 dues from stations at \$20 .....	1,020.00
To one-half certificate of deposit of December 23, 1918 for \$1,000 with interest at 4 percent, December 23, 1918 to September 9, 1919 .....	528.56
<b>Total receipts .....</b>	<b>\$3,516.43</b>
<b>Disbursements as per statement .....</b>	<b>3,044.76</b>
<b>Balance on hand November 12, 1919 .....</b>	<b>\$ 471.67</b>

## DISBURSEMENTS

Executive Committee .....	\$1,089.97
Delegate American Council Education .....	168.08
Secretary-treasurer .....	77.37
Proceedings Thirty-second Convention (printing, stenographic service, editing, expressage, postage, etc.) .....	1,709.34
	<hr/>
	\$3,044.76

## ASSETS

Cash on hand, November 12, 1919 .....	\$ 471.67
Certificate of deposit (City Trust Co., Sept. 9, 1919) .....	500.00
Two months' interest at 4 percent on \$500 (to Nov. 9) .....	3.33
Liberty bonds (third issue)—par value \$2,000 .....	2,000.00
All coupons attached, matured to date .....	114.18
	<hr/>
	\$3,089.18

On motion, an auditing committee consisting of President W. H. Smith of Mississippi and Dean A. B. Cordley of Oregon were appointed, which, later, reported as follows:

## REPORT OF THE AUDITING COMMITTEE

The auditing committee has examined the accounts of the treasurer and finds the same to be correct. All vouchers properly approved and receipted have been found on file. It also finds a bank balance as stated of \$471.67, and finds in the treasurer's hands two (2) Liberty Bonds of the third issue for one thousand dollars (\$1,000) each, numbers 496,153 and 496,154, with all coupons attached, bearing interest at the rate of 4½ percent per annum, and a certificate of deposit for \$500, dated September 9, 1919, bearing simple interest at the rate of 4 percent per annum.

W. H. SMITH,  
A. B. CORDLEY,  
*Auditing Committee*

On motion, the report of the auditing committee was received.

**THE PRESIDENT.** In accordance with the recommendations made by the Executive Committee and adopted by the Association (pages 20-21 ) I will appoint:

As Committee on Memorial: Presidents H. A. Morgan of Tennessee and F. D. Kedzie of Michigan and Dean Eugene Davenport of Illinois.

As representatives to the American Council of Education: Dean Eugene Davenport of Illinois for three years, President R. A. Pearson of Iowa for two years, President W. J. Kerr of Oregon for one year.

On motion, a recess was taken until 8 P. M.

## EVENING SESSION, WEDNESDAY, NOVEMBER 12, 1919.

The Convention was called to order at 8 P. M. by the Vice-President, President A. M. Soule of the Georgia State School of Agriculture.

**THE VICE-PRESIDENT.** The annual presidential address will be delivered by President Chas. A. Lory of the State Agricultural College of Colorado, the title being "An Institutional Program for State Development."

#### PRESIDENTIAL ADDRESS

#### "AN INSTITUTIONAL PROGRAM FOR STATE DEVELOPMENT"

BY C. A. LORY

The institutions represented in this Association find themselves in a particularly satisfactory condition following the World War. We are more nearly on our prewar basis than either industry or commerce and one year after the signing of the armistice our work is going forward with an assurance and stability that not even the most optimistic among us dared to expect. Most surprising of all are our increases in enrollment. Not only have we as many students as were registered in 1916, but we have gone beyond the record of that year with increases reaching in some institutions as high as 100 percent. We have made up our war losses in enrollment, and in many instances have more than attained the regular rate of increase in attendance. Our students are but little affected by the general unrest and dissatisfaction. They are interested in carrying on their studies, in placing athletics on a satisfactory basis and in putting their fraternity and student activity relations in order.

Our faculties, hard hit by increased cost of living and by the mounting cost of departmental operation, with difficulties multiplied because of inadequate salaries, with insufficient departmental budgets and augmented work and responsibilities, harrassed by tempting offers from the industries, are responding in a wonderful way to the instinct of the true teacher and to the call for service. Glorifying in their large classes, they are working with might and main to meet the situation and to maintain scholastic standards. The early wave of apprehension and discontent that seemed so threatening last spring, when constantly increasing costs reduced their salaries to about half their prewar purchasing power, leading them to make efforts toward collective buying and to contemplate unionizing, seems for the present to have entirely subsided and to have given way to a determined effort to do the most effective work possible. Institutional finances are strained to the limit and the budget reserve funds are all too small, but legislatures and emergency boards generally are alive to the situation and are earnestly striving to help. And trustee boards are also striving as best they may to increase inadequate stipends and must continue so to strive.

The regular, orderly work of the colleges and universities stands out in sharp contrast to the uncertainty and dissatisfaction so strongly in evidence in general human relationships and may be looked upon as a factor of safety and sanity, whose influence can not be overestimated.

It is this rapid "come back" of our colleges from the change in organization and curricula necessary to meet war conditions that emphasizes the basic soundness and adaptability of the land-grant college system, perhaps even more than the actual test of war itself. Yet we may be pardoned a manifestation of pride in the war record of our institutions, in the rapidity and completeness shown in the mobilization of our resources

for state and national service, in the fine spirit of our students, alumni and faculties, in their quick response to every call and in the splendid service record they made, in the wonderful usefulness of the accumulated information of our experiment stations, in the adaptability of the college and university plants as special training centers, and in the astonishing overload capacity and versatility of our extension service. We find satisfaction, also, in the discovery that the shortcomings in our work and the weaknesses in our system of organization as developed by the war are such as had been often called to our attention in former conventions of this Association.

It is this "running true to form" of the land-grant institutions under the test of war, and their quick return to practically prewar conditions, that has given the speaker courage to address you on "An Institutional Program for State Development." In doing this, he is urging you to extend a well-developed and tried-out system. He is recommending that methods heretofore found satisfactory and dependable be used in attacking new problems and in extending the field of usefulness of our institutions. He would hesitate, however, to venture on so broad a topic were he not able to fortify his statements with the state service record of every institution here represented. Every separate element of his program presented for your consideration has been ably reviewed in former conventions. He desires to give full credit and due acknowledgment to the speakers who in times past have discussed these matters before this Association and to express his belief that the best guidebooks for any one interested in working out an institutional program for state development are the proceedings of the annual conventions of this Association. The fact that development can be had only through the education of the people has been constantly kept in mind; also, the fact that efforts at domination and regulation can have no place in institutional plans for state development.

We have found our institutions to be capable of vastly greater service, both in volume and variety of activities, than would seem to be warranted by our most optimistic dreams or by the fondest expectations of those noble men of old who helped to frame and pass the Morrill Act of 1862. Their quick readjustment to peace-time conditions indicates a stability and dependable steadiness which should reassure us in the face of any undertaking. Knowing these things, should we not ask ourselves, What are we going to do about it? Shall we content ourselves in smug contemplation of a great work well done, satisfied to drop into the place in which we found ourselves before the war, or shall we utilize our knowledge of the broad versatility and effectiveness of our institutions in concluding a carefully planned program of developing the agricultural, industrial and civil resources of our states? Our very efficiency during the war is a challenge to us for greater service in peace-times—in a state-development program in fields logically our own, for the cultivation of which the land-grant institutions are best fitted and qualified.

We can further the agricultural development of the State:

1. By strengthening our institutional facilities for instruction, research and extension service in rural economics, rural sociology and country life betterment, with special attention to farm management and marketing.

- 2 By increasing the educational opportunities for the youth of the country through cooperation with the high school, in teaching agriculture

and home economics and in general community service, thereby extending the land-grant college ideal in education to the rural high schools.

3. By striving to secure better educational facilities for the children of the country.

We may promote the industrial development of the State:

1. By so activating our Colleges of Mechanic Arts along teaching, research and extension lines that they will come to occupy the same relationship to the industries of the State as our Colleges of Agriculture do to agriculture.

2. By increasing the educational opportunities for the youth of our cities and industrial centers through cooperation with the technical high schools and the high schools functioning under the National Vocational Education Act in trade and industrial education.

We may provide for stronger leadership in the educational and civil development of the State through better teaching in land-grant institutions and better teacher-training work.

1. By advocating the establishment in each state of a representative advisory council to meet with the workers of the land-grant institution for the purpose of formulating an institutional program for state development.

2. By encouraging the provision through legislative enactment of a State Development Commission for furthering the cause of general state development.

#### OUR OPPORTUNITIES IN RURAL ECONOMICS, RURAL SOCIOLOGY AND COUNTRY LIFE DEVELOPMENT

The need for more information touching country life conditions and the farmer's business, the need of leadership in rural sociology and country life improvement and the need of a constructive program for country life betterment in our extension activities are generally recognized and have often been emphasized before this Association. Looking into the future and keeping in mind how these needs were emphasized during the war, the importance of a constructive program becomes obvious. Sufficient progress has been made in many of our institutions to encourage us to undertake this work with confidence. Not only have several of our colleges accumulated data and formulated conclusions but we may benefit by the researches of the Federal Department of Agriculture in its Bureau of Markets and Office of Management.

However, our institutions must secure further information as to farm costs, must know more about farming as a business, must learn more about marketing. The farmer has a right to expect and is coming to insist that his Land-Grant College help him in his marketing problems, in his farm management problems, in his community improvement problems as it has in connection with production. He needs to know more about farm labor, the times of rush work, of peak-loads, of the sources of supply. Our institutions must set themselves to the task of learning with the farmer how he can stabilize his labor requirements, how he can raise farm labor from its present unsatisfactory condition and make farm work so desirable that he can more surely hold his own in competition with the industries.

The question of farm tenantry is fundamental in agricultural development. We need much more information in order that our institutions may be of real assistance in improving present day conditions. The effect of



land speculation and the movement looking for state aid in land settlement are questions of immediate concern.

In the task of improving women's relations to the farm and in our study of women's work and housing conditions, we have gone only far enough to learn the vital need of further study and to appreciate that the home demonstration agent is just as important as the county agent in safeguarding and developing agricultural production and improving country life conditions.

Our institutions have gone far enough in boys' and girls' club work to demonstrate the wonderful possibilities of this junior extension service. Naturally this experience should be used in strengthening our program in rural education and recreation. As our study of community betterment advances, we should strive increasingly to cooperate with the many agencies now working in the various phases of country life betterment. As institutions, we have given too little attention to the need for education in the country. We have been charged with forgetting the fact that we can not hope for better farmers and better farms unless we have better schools. We have given much thought to the study of soils, crops, livestock, plant and animal diseases, the factors that control production. We must now set ourselves to the equally important task of studying the farmer, his family, his environment, his capacity as a manager and as a salesman, his opportunity for training himself as a citizen and as a farm operator, his farmers' organizations, his ways of doing business and the conditions governing the marketing of his products. We should not be content until we have accumulated sufficient information, through experiment station projects in the broad fields of rural economics, rural sociology and farm management adequately to equip us for the training of leaders and for extension work in country life betterment on the same broad, effective planes on which we have established our present instruction and field work in agriculture and home economics. It is not that we have overstressed production, but that we have not paid enough attention to the human side of farming.

#### COOPERATION WITH HIGH SCHOOLS

The Land-Grant Colleges generally are not in close touch with high schools. We have been content to take their graduates into our freshman classes, concerned only that they meet our entrance requirements, and have either remained indifferent to or, indeed, have been inclined to discourage any attempts they might make to introduce vocational training. We have been so well satisfied to have the high schools serve as preparatory schools for college entrance, limited in function by a narrow cultural ideal, that we have manifested little sympathy with a desire on their part to enter upon a broader program of community service. The enactment of the National Vocational Education Act found us unprepared, either in teacher-training facilities or in our relation with our high schools, to afford the assistance in the inauguration of this important educational enterprise that our school system had a right to expect of us. Our institutions have experienced difficulty in connecting up with these schools in this work and in getting upon a basis of correlation or cooperation with them in our extension programs. Surely the importance of these two agencies working together in the educational and industrial development of our states can not be overestimated. Their efforts should be united with our own. It

would be unfortunate, indeed, if they are not closely related and correlated in every state in the land. The operation of the federal enactment opens up wonderful possibilities for the broad extension of the land-grant system of education to the vocational high schools of the State, providing as it does for vocational instruction in agriculture, home economics and trade and industrial subjects, with all-year service and supervised summer projects. In their development, these schools will naturally follow the land-grant college ideal in education and will tend to grow into true and effective community centers with short courses, evening classes and extension activities. Much of the community service and agricultural extension work now done by the colleges can be accomplished by these community-service high schools in cooperation with the colleges; indeed, there appears to open before us a vast range of possibilities in community betterment. In the course of time, they should relieve the colleges of much of the elementary work now done in agriculture and home economics, enabling them to devote more time and funds to advanced instruction.

Generally speaking, our land-grant institutions have found it easy to inaugurate teacher-training work in agriculture and home economics required by the National Vocational Education Act and comparatively easy to establish a promising basis of cooperation with the Smith-Hughes schools in agriculture and home economics. Generally speaking, also, our institutions are alive to the possibilities offered in the development of these schools and are earnestly trying to get in touch with them. The Land-Grant College has been designated in almost every state by the State Board for Vocational Education as the institution at which the training of teachers in agriculture and home economics shall be done. It is unfortunate that in some states these boards have not consummated this obviously desirable arrangement, unfortunate both from the standpoint of the colleges and from the standpoint of the high schools. This Association should look with apprehension upon the assignment of training work in agriculture and in home economics to any institution except the Land-Grant College for such would be counter to the interests of future teachers as well as of the State as a whole.

Our problems in respect to vocational high schools teaching trade and industrial subjects are much more difficult. In teacher-training work in this field, we are now limited to the training of so-called related-subject-matter teachers and to instruction given in the art of teaching to journeymen in the trades. There is danger also that the instructors in our highly specialized engineering divisions may not realize the opportunity offered for establishing a closer relationship with the industries of the State through these vocational industrial high schools. Established as they are in the industrial centers, through their continuation, part-time and night schools, they will naturally come into the closest relationship with the industries. Surely, herein lies a wonderful opportunity for the mechanic arts divisions of our Land-Grant Colleges to cooperate in a broad way with people with whom heretofore they have not been in very close touch. They can thus enter into a much closer relationship with the industries, developing a field for industrial extension service fully as important economically as is our work in agriculture and home economics.

## RURAL SCHOOL IMPROVEMENT

Rural school improvement may well be looked upon as a part of country life betterment and as having been covered in our discussion of country life development; but it is of such basic importance in state development that it well merits special consideration at every Land-Grant College. Objection may be made that this line of effort belongs logically in the field of the State Department of Education and that if the college enters upon it not only will it be guilty of duplication but also of trespass. This objection may be deemed valid if the State Department has a well developed program of rural school betterment and is pushing the work with vigor, in which case, no doubt, if its head is broad-minded, it has already enlisted the cooperation of the college people. We have long known that the rural school was not measuring up to its obligation in training country children, but not until our youth was called into military service and we had positive information of the illiteracy and lack of training among the soldiers coming from the rural districts did we know how far short it has been falling of accomplishing its mission.

Strangely enough, in the effort looking toward the betterment of this situation, we have usually met with the determined opposition of the farmer patrons. It is not difficult to understand this attitude when we recall that first of all the farmer is naturally jealous of his rights and that he has been told by politicians and educators for years that the little red school house is the acme of educational perfection and the palladium of his liberties. No matter how poor is the rural school in reality, in its buildings, furnishings, location and teaching, the facts were forgotten in listening to flowery descriptions of its imaginary virtues and influence. Established in pioneer times and well adapted to pioneer conditions, the one-room school for country children still survives, unchanged in building, poorer in teaching, crippled in its ability to serve the community, inadequately supported, almost unaffected by the improvements in urban or higher education, unaffected by the advance in farming methods and by the material development of our countryside. During the last half century the development of our great State Universities and Land-Grant Colleges, of our public high schools, of our vocational and technical high schools and of the grade systems in the urban public schools has been phenomenal, but during this time little effort has been put forth and little progress made in improving the one-room country school. The fault lies, primarily, with our educators who have been lamentably lacking in leadership and void of vision.

Enough has been accomplished in the progressive States to show that the problem is neither impossible nor especially difficult. The conservatism and opposition of the farmers give way when they are shown a workable plan for getting better schools, a plan that enlists their leadership and their genius in providing better educational facilities for their children. In this work the Land-Grant College can not escape its obligation to the children any more than in the past it could have escaped its obligation to the parents. We have established a very effective extension service to help adult farmers, most of whom have had very poor and inadequate schooling, we have found it necessary to devote our time to elementary instruction in the rudiments of agriculture, because this work has been entirely neglected in the schools and we have been and are helping these farmers

without taking thought of the morrow as to the constantly renewed supply of poorly trained and poorly educated farmers growing up in the country schools. Our system may well be likened to the efforts of the physicians of a community to stop an epidemic by treating those afflicted without attempting to determine the source of infection.

The farmer has a right to expect information as to better schools and the means of procuring better educational facilities for his children from the institution that has helped him so effectively with his agricultural problems. We can not overemphasize the fact that better farming is dependent upon better country schools. We can not expect that inadequately taught country boys and girls will measure up or hold their own in the ordinary duties of citizenship or in the competition of modern life. The menace to the future of our country that lies in this meager training has long been recognized. We must assume our share of responsibility for correcting this condition and undertake the leadership in this work. The Land-Grant College knows the farmer and has his confidence. It is better fitted than is any other institution to study the rural school problem in its own state to gather information touching the conditions in other states and with the result in hand to work out plans for improvement. Naturally it should cooperate with every organization interested in the country schools and should try to bring about a unified effort. It should employ one or more specialists, members of the extension staff, on full time, to cooperate with county superintendents, farmers' organizations and rural communities in rural school improvement. It should not relax its efforts until it has brought to the children of the country educational advantages at least comparable to those enjoyed by the children of the cities and established a rural school system capable of giving such basic training in the grades and high school as is essential to twentieth century farming and for twentieth century citizenship.

#### EXTENSION OF THE FUNCTIONS OF OUR COLLEGES OF MECHANIC ARTS

The development of our Colleges of Agriculture is familiar to all. We know the early difficulties experienced in building up technical instruction in agriculture, the work that had to be done in training teachers and developing textbooks. We remember the indifferent and critical attitude of the farmers toward institutions designed to train farmers which they felt were presided over by so-called book-farmers. We realize what efforts had to be put forth in order to overcome this attitude and change it to one of respect and good will. We recollect the slow development of the experiment station idea born in the crying need for further information and nourished by the intense desire to serve. We recall the early efforts at research, the recognition of the need for conference and exchange of ideas, the conviction that federal aid must be secured and the campaign that resulted in the passage of the Hatch Act. We point with pride to the development of this educational work which has won growing support from our States and the approval of the national Congress, expressed in the amendment to the Morrill Act. We remember the growth of our experiment stations in state and national favor, resulting in the passage of the Adams Act. We appreciate the more recent development of our extension service, an outgrowth of the field activities of the experiment station workers and of the efforts of the instructional staff to obtain first-hand

information as to farming conditions, a work carried forward by the intense driving power of the growing ideal of state service. We know the men and the work they did in securing national recognition and support through the passage of the Smith-Lever Act, and the wonderfully effective organization for state service in the upbuilding of agriculture and home economics thus made possible. We realize the development and the growth of the Federal Department of Agriculture, recognize the very effective relationship existing between it and our own institutions and rejoice in the splendid work done by this powerful agency established in behalf of national service and state development.

Every one who has been privileged to attend a convention of this Association knows how helpful it has been to the Department and to the Colleges of Agriculture as a clearing house of ideas and experiences, as a council chamber in planning and outlining policies, as an aggressive organization for carrying these policies into effect. We who have been privileged to work in the Association know that without it the present development of the Colleges of Agriculture would have been impossible.

Knowing all this, we well may ask why was not the same plan followed in the development of our Mechanic Arts Colleges? Why should it not begin now? We have developed our work in home economics parallel to agriculture in resident instruction, in research and in extension activities, but only recently have we begun seriously to establish the work in engineering upon the same basic plan.

Without attempting to explain why, the fact remains that our Mechanic Arts Colleges are not in close touch with the industries and that as at present developed and operated little progress is being made towards changing the situation. We have done and are doing good work in training highly specialized technicians and engineers and have maintained contact with the technical or engineering staffs of industry; but here our contact ends. We are doing little or nothing for the workers in industry. In the present crisis of industrial unrest and readjustment, our institutions as such stand aloof, possessing neither the knowledge of conditions nor the organization to be of material assistance. If a similar situation confronted agriculture, we could mobilize in a day our trained workers in college, station and extension staffs, under the leadership of the Department of Agriculture and at least experience the satisfaction that comes from the attempt to serve. Should, for example, the crops of the Paradox Valley in Western Colorado, 70 miles from the railroad, be threatened by rodent pests, tried and proved methods of control could be inaugurated at a day's notice by the State Agricultural College. But when our steel and coal mining industries, employing thousands of men and absolutely essential to the industrial life of the State are closed down by strikes, the institution can do so little that it is not even called into conference by either operatives or employees. Is the situation in Colorado unique, or is it typical?

The need of engineering experiment stations, perhaps we should say industrial experiment stations, is clearly recognized. They have been established by about a fourth of the institutions here represented. The need for extension work is also receiving recognition in the employment of a few engineering extension workers. Much of this development is along the lines of agricultural engineering, not because the need is greater

but because such work is more readily established in cooperation with the station and extension activities in agriculture and home economics. Should we not set ourselves to the task of rendering service to the field of industry comparable to that we are rendering in agriculture? This does not mean that we should lessen or weaken our effort in training engineers, but it does mean that we should turn from the narrow professional ideal to the wider state service ideal. Our Mechanic Arts Colleges should set for themselves the goal of getting in as close touch with the workers in the industries and with the operators as our Colleges of Agriculture are with the farmers, and should strive to serve their constituencies with zeal and interest in their welfare similar to that long manifested in their sister divisions. Profiting by the experience of Colleges of Agriculture, they should give even more immediate attention to the man in industry, to his problems and his needs than to the technical needs of industry as such. It would be presumptuous for us to say that much of the present unhappy industrial situation might have been averted had our institutions known more of human engineering and of the basic laws governing the relationship between employer and employee; but the assertion can be made with confidence that they must possess such information if they are to function as they should in their attempts to help to remedy present day conditions.

Should not the Land-Grant Colleges assume a greater responsibility toward the industries than heretofore? Should they not undertake to train workers through short courses and extension courses and in cooperation with the industrial and vocational high schools? Should they not set themselves resolutely to the task of developing and training our native born workers, thereby in large measure liberating industry from the need of importing foreign workmen? Our present industrial situation shows the danger which lurks in large groups of unassimilated foreigners. Is it not reasonable to suppose that had our Land-Grant Colleges been in as close touch with the industries as they have been with agriculture, this danger would have been more clearly recognized and means devised for the more adequate Americanization of these men?

Of course the difficulties are stupendous; but there is no reason to suppose that they are greater than those which confronted our forbears in the early development of the Colleges of Agriculture. Animated by the same ideal of service, starting in the same modest way and learning from experience, the work can be inaugurated and state and federal support can be secured. As an Association and as individual institutions, our efforts should be concentrated on securing the establishment of engineering experiment stations, through congressional recognition and support; and we should at the same time seek to promote the gradual expansion of the functions of the Federal Departments of Labor and of Commerce, industrially comparable to the position held by the Federal Department of Agriculture.

This Association should make possible to the men of our Mechanic Arts Colleges an opportunity for conference and counsel similar to that so long enjoyed by their colleagues in the Colleges of Agriculture. This has been in fact an Association of American Agricultural Colleges and Experiment Stations. It should be broadened to be truly representative of the Land-Grant Colleges and Universities in their entirety, and support the development of mechanic arts with the same energy, enthusiasm and

far-seeing ability that it has devoted to agriculture. Less time and consideration than heretofore should not be given to agriculture and home economics, but the functions of the Association should be broadened, so that mechanic arts may stand on a parity in all respects with agriculture and home economics.

#### IMPROVEMENT OF OUR TEACHING AND TEACHER-TRAINING

Teaching still is and must always remain the most significant work of our colleges. The tendency to overlook this importance seems to be growing, relatively more attention being paid to station work and to extension development. The larger salaries which are paid and the more frequent opportunities which are offered to travel and to publish have served to make station and extension work more attractive than is teaching. The problems of the teacher in large measure have been overlooked in state and national gatherings; he has had little opportunity to make himself known; he has no chance to tell of his work; he has become impressed with the idea that there are better opportunities in station and extension fields and has either deserted teaching or grown unhappy and discontented with his lot. And he has not hesitated to advise his students against entering upon a teaching career and to discourage efforts at teacher-training work. In much the same manner that our institutions have tended to overlook the human element in farming, so they have been inclined to overlook the work of the teacher, to minimize the importance of adequate teaching, of the right kind of student leadership. Our county agents are extensively and successfully using the plan of ferreting out good farmers in order that they may demonstrate better farming methods to their less well-informed neighbors. Might it not be worth while to use this plan on the campus to improve our own teaching practices? Surely the importance of our resident instruction and extension teaching warrants the utmost care and interest in the improvement of our methods. Moreover, teaching is largely an imitative art; we can scarcely hope to train teachers satisfactorily if good instructors are not placed in charge of teacher-training classes. Year after year the Committee on Instruction in Agriculture of this Association has emphasized the need of teacher-training and insisted that more attention should be paid to this important work. And it has stressed the fact that as institutions we are not measuring up to the moral obligations imposed upon us by the provisions of the Nelson Amendment.

These are the things which must be done in the immediate future, if our States and our Nation are to advance economically and sociologically. And the Land-Grant Colleges are especially well equipped to deal with them. Whether or not our institutions will heed the challenge, and, having heeded, will take quick, effective action is best answered by looking over their records for the past 50 years. No one who makes such a survey can fail to realize that they will occupy the vanguard in the future as in the past.

#### A REPRESENTATIVE COUNCIL NEEDED IN PLANNING STATE DEVELOPMENT PROJECTS

The planning of institutional programs for state development by the Land-Grant Colleges calls for a broad, many-sided knowledge of state conditions. The men of the colleges working alone, even though all phases of institutional work are fully represented, are too much influenced by in-

stitutional limitations unaidedly to plan a comprehensive state program. They need the assistance of an advisory council, representative of the agricultural, industrial, commercial, professional, religious, public health and welfare activities of the State. Delegated to serve their several associations at the request of the governing board of the institution, its members would be of signal service in placing a panorama of state conditions before the board and institutional staff, assembled in annual or special meeting for the formulation of state development projects. The very fact that a group of representative citizens was joining with the governing board and faculty of the State University or Agricultural College to study state development and to formulate plans for promoting this development would appeal to the average citizen. A mutual exchange of ideas would help the college men to think in state terms and would show the members of the advisory council institutional possibilities and limitations. The recommendations of such a joint council would merit and receive legislative consideration and the knowledge of conditions and the support given the program by the members of the advisory council would prove a powerful factor in putting it into effect.

#### A STATE DEVELOPMENT COMMISSION

The success of such an institutional program as we have here discussed will depend largely upon the cooperation of other state development agencies as well as of the people at large. This fact accentuates the need for and advantages of a state development commission organized and maintained for the purpose of furthering state growth and expansion in a broad and state-wide way. Through such a commission, if properly organized, our institutions, the farmers' organizations, the representatives of capital interested in industrial projects, commercial clubs, welfare workers and the various state boards and commissions devoted to development projects could be brought together and their activities so coordinated and correlated as materially to advance the efforts of each and greatly to multiply the benefit received by the State as a whole.

The advantages accruing from the creation of such a state development commission have long been recognized and notable progress was made before the war along these lines. State Councils of Defense demonstrated the great usefulness of an organization of representative citizens devoted to safeguarding during war times state interests. It is unfortunate that these organizations could not have been continued as state councils of development.

A year ago the President of this Association, in a masterly address, outlined the need of a "National Policy in Agriculture" and specifically recommended "That the Association memorialize both Congress and the President of the United States to join in the appointment of a permanent agricultural commission, not of officials but of representative citizens, a personnel representative not only of farming as a business and of agricultural personnel, representative not only of farming as a business and of agriculture as a national enterprise, but also of other interests, particularly labor and capitalized industry, a body competent to consider from time to time the agricultural situation and its needs, charged not with the duty of drafting bills looking to specific legislation but of preparing and publishing findings that shall be regarded as advisory to our government and that



also may be helpful in creating healthy public opinion and influential in establishing and maintaining sound national policies in agriculture." We may well ask ourselves if there is not likewise needed as a part of the national policy in agriculture a state policy in agriculture; and, in the light of our present industrial situation, whether there is not needed also a state policy in industry. Should not the members of this Association, in addition to the support they give to its efforts in behalf of a national agricultural commission, call to the attention of Governors and State Legislatures the need and the advantage of a state development commission, representative in membership of all phases of state activity, appointed by the Governor and the Legislature, and charged with making a study of and holding hearings on matters relating to the agricultural, industrial, commercial and civic development of the State, with preparing and publishing reports and findings that shall be regarded as advisory to the Governor and the Legislature, with creating a healthy public opinion and influential in establishing and maintaining a sound state policy of development?

**THE VICE-PRESIDENT.** The discussion of the subject presented by President Lory will be continued by President W. M. Riggs of South Carolina

**W. M. RIGGS.** That portion of the president's paper dealing with engineering experiment stations is deserving of great respect, if for no other reason than its extreme age. We have been attempting to bring about legislation to establish engineering experiment stations for very many years.

During the last three or four years two principal types of legislation have been before Congress. This Association has stood for the idea embodied in the original Newlands bill, namely, that all Acts of Congress in support of work in agriculture and mechanic arts should be so framed that all the work should be centered at the Land-Grant Colleges. It has been argued from our point of view that the engineering experiment station is a logical completion of our edifice. Our institutions might be likened to three-story buildings on one side, with uncompleted structures on the other, with only one story representing engineering teaching. Efforts have been made on the part of another group of institutions to secure the passage of a bill by virtue of which each state legislature would determine the institution to establish and maintain the engineering experiment station. One group has opposed the effort of the other. Practically little advance has thus far been made.

Recently, a conference has been held between representatives of the two opposing factions and a bill prepared in which occurs the following clause:

"That the State Legislature of each state is hereby authorized to designate and appoint that institution of its respective state which is best equipped and organized to conduct the work under this Act; provided, however, that in a state having a Land-Grant College possessing facilities for conducting the work provided for by this Act approximately equal to other institutions in that state, the Land-Grant College shall be designated the institution for the proposed station."

This compromise takes a middle position between the two extremes. I am not sure that this Association will approve it; but it seems to me that it holds out the only hope of securing results in the near future. Certainly as long as there are two factions Congress will not act. The passage of the

compromise measure would bring about a struggle between institutions before the legislature in some states, but it is thought that the engineering experiment station would be located ultimately at the Land-Grant College in all but four or five States.

**THE VICE-PRESIDENT.** The discussion of President Lory's paper will be continued by President W. J. Kerr of Oregon.

**W. J. KERR.** President Lory's central idea seems to be that there should be a close relationship between the land-grant institutions on the one hand and several state organizations or interests on the other. This is fundamentally important; it cannot be too strongly emphasized by those who are connected with these institutions. If we are to render the greatest service there must be mutual understanding between the institutions and the various state interests.

I was particularly interested in his reference to the importance of an organization which would result in cooperative effort in planning institutional projects wherein representatives of different state interests would work with representatives of our institutions and I liked his idea of a state development commission. It may not be practicable in all states to secure a commission that will function in state development work, as did the state councils of defence in war activities. But nevertheless much can be done by the cooperative efforts of those representing different lines of work, different industries and interests.

We have been wont to view the attitude towards the land-grant institutions of those connected with other educational institutions as being extremely narrow. Tonight, as I listened to this address, I wondered if after all our own attitude in regard to the field and function of land-grant institutions has not been narrow. Have we always had the broad vision of our field and function, a complete comprehension of the tremendous responsibilities resting on these institutions in state and national service? This Association for many years has represented only the field of agriculture; later, some consideration was given to the field of engineering, which we all know is coordinate with agriculture in the organic act of 1862; and, yet later, home economics has been brought within the fold.

The one thing which I stress is this: These institutions occupy a strategic position of leadership in the entire field of industrial education and industrial development. We should accept that responsibility, maintain that leadership and do our part in the discharge of our duties to State and Nation in this field.

The Chairman of the Executive Committee, in requesting a discussion of the president's address, suggested that there might be presented some variations suggested by experience in our own States. Take the field of rural education. We have heard much of late about the importance of improving rural schools. I wonder if our own institutions have done their full part in that movement.

While the people at large have come to recognize the importance of vocational training, the fact still remains that we fall very short of the ideal in the development of industrial training in our schools. Certainly, of all institutions in this country, the Land-Grant Colleges stand for democratization in education and equality of opportunity in education, for the thesis that all the people should have an equal opportunity for the best

possible training in the schools in preparation for their life work—equally in the rural districts and in the cities. This being true, these institutions should exercise their great influence in the development of industrial training in rural and in city schools, but especially in the improvement of rural schools.

I deem it no less important that the great mass of city children be given an opportunity to obtain industrial training than it is that the rural pupils should have opportunity to study agriculture; yet there are many schools in every State where no provision is made for this work.

All work in training teachers in agriculture, commerce, home economics, the trades and industries, is assigned definitely and exclusively in Oregon to the State Agricultural College. The training of Smith-Hughes teachers has also been so assigned.

We have developed a very complete and efficient organization for the improvement of the farm and the farm home. Our extension organization is functioning most effectively in the field of agriculture and home economics. Is it not our duty to do similar work in our industrial centers, to help the workers in the trades and industries as we are helping the people on the farm and in the farm home? It can be done. There is much interest on the part of the people in this type of work. For years we have been doing such work in the city of Portland. The people are so interested in it that last winter, on their own initiative, the proposition was made that the legislature make a special appropriation for extension in engineering and also the trades and industries. A member of the legislature, supposedly representing the labor interests, proposed a special appropriation for an engineering laboratory in Portland, in order that the institution might be in better position to serve the people in that industrial center. These suggestions came at an inopportune time, and no appropriations were made; but I am sure that at the next session representatives of the trades will insist that appropriations be made to the State Agricultural College for extension work in engineering, trades and industries.

We certainly can not cover this whole field and do our duty by all the people as long as we confine our efforts in the main to the people in the open country. Vital as the work with these people may be, we must recognize the importance of our work with the other people equally entitled to our help. May I mention again, by way of emphasis, the central thought running through the entire address of our president, which should be taken to heart by us all, an endeavor greater than ever before to get close to the people, close to the different industries and interests of our several States, that we may have the benefit of the advice of thinking people in every line represented in the work of our institutions, that our work may be planned most wisely and our efforts made most productive of the greatest good in advancing not only the interests of our own institutions and States but of the Nation as a whole.

**THE VICE-PRESIDENT.** The discussion will be continued by President W. B. Bizzell of Texas.

**W. B. BIZZELL.** "A National Policy in Agriculture" was developed by Dean Davenport in his presidential address at Baltimore last January. It seems to me that in the address we have heard tonight the relationship of our Land-Grant Colleges to such a program has been set forth.

In the first place, stress has been laid on rural social science in the development of this plan. Sometimes we hear it said that agriculture as a means of livelihood is the safest of all professions, but as a business it is the most hazardous. I think that is true, because we do not often hear of people starving on the farm, whereas we are very familiar with the fact that there is little evidence shown of business policy or business success in farm enterprises. An illustration of the marketing aspect seems pertinent in this connection. A man recently told me that grain sorghum was sold at Ballanger, Texas, at \$10 a ton and at another place at \$60 a ton. In some markets corn was selling at 75 cents, while at Kansas City it sold at \$1.35 a bushel.

The Agricultural Colleges must take the leadership in this matter of marketing. We have almost as many economic experts in the country today on the subject of marketing cotton products as we have growers. There are all kinds of theories and claims made by people who talk about it. You can find in my State all kinds of explanations for the present price of cotton; but I have noticed that when cotton drops off a little, you hear little from those experts who are so prone to speak on the subject.

If the colleges are to hold the esteem of the people they must do so through a clear conception of the question of economics. The trouble with rural economics is that too many of us are not well grounded in fundamental economics and that as a result much heresy and false doctrine are propagated. I find when I go out in the country following the work of the county demonstration agent and meet on the farm the man who tells me about the wonderful thing he has done in the way of improving methods of production that he has got the idea from the county demonstration agent or from some specialist. However, one thing he never claims for himself. When a new policy of marketing is worked out, he knows where it comes from. The farmer knows that he is not responsible for a better system of marketing that increases his actual income. The college gets credit for that when it wins and blame when it falls. And for that reason, I think we need a wiser and a more definite policy with respect to that situation.

Now, the farmers in the South can diversify their crops, but they persist in making cotton their principal crop. They never hope to learn how to market their product. They work throughout the season to grow the crop and then take it into town or take samples to the cotton buyer. They then are as helpless as children, because they must accept the grade and character of their samples without knowing whether it is true or false; and our experience teaches us that usually samples are not graded properly. So it seems to me that we must seek in the future in our work in agricultural economics to assist the farmer in specialization—the specialization of marketing.

Now, in regard to social science: It seems that we need to differentiate two groups of men who should take those courses. In the first place, we have a group of specialists—men who should know the technique of social science. I think that this group should understand general sociology and should understand the principles of statistics. I think there is also need for a large group of men to study general conditions. I will tell you candidly that such studies and investigations as I have made of the data that have been secured lead me to the conclusion that much of it is defective

and the conclusions based thereon unwarranted, for the reason that the investigators were not properly grounded in the principles of statistics and knew very little about assembling and making intelligent use of the data they had secured.

Then on the other hand we need the more popular course of rural sociology to be offered all men who pursue those courses for the purpose of acquiring inspiration and vision and increasing their conception of social organization as they go into the world. The trouble with our students technically trained in engineering and agriculture is that they lack social vision of the things that they are called upon to do. They usually feel that the State has been providing facilities for their individual benefit and for their own selfish ends, without regard to the social benefits that might come through the knowledge they have obtained.

It seems to me that the attitude of the college in projecting its activities into the industries, through extension and other means, depends upon two things, namely, the development of the state's industries and the attitude of other agencies that have entered the field or that are already assuming responsibility for some phase of this work.

I think the trouble with the average college administrator is that he is likely to sit in his office and theorize about what he wants his college to become. He does not look at his college policies from the standpoint of the man on the street, who has real problems confronting him every day and who is unconsciously expecting the college to come to his relief.

So I think there is room for some kind of an organization of agriculture, commerce and industry for the purpose of formulating a program and giving the college the benefit of its conception of what is needed to be done. A state commission for the purpose of correlating these agencies is needed. Of course, there is danger in an agency of this kind and in the method of its appointment. Its duties and responsibilities are all matters of deep concern. Nevertheless there are possibilities for coordinating agencies in every state in which the college should be interested. We can profitably use the information or the policies given us in promoting the work of our colleges in the various States. We might work out the program presented last year, with the idea that the national policy and the state policy must coordinate if we are to accomplish the most for our respective States as well as for the Nation.

**THE VICE-PRESIDENT.** The report of the Committee on College Organization and Policy will be presented by President K. L. Butterfield of the Massachusetts Agricultural College, Chairman.

**K. L. BUTTERFIELD** of Massachusetts. The Committee respectfully reports as follows:

#### **REPORT OF THE COMMITTEE ON COLLEGE ORGANIZATION AND POLICY**

##### **SALARY INCREASES IN THE COLLEGES**

A matter of policy so important as to be at present almost vital faces all our Land-Grant Colleges. It is the need of securing substantial salary increases for staff members. The Committee recommend that the Association give emphasis to this need and the reason therefor in order that

member-institutions may use such action in their efforts to secure these increases.

#### **SALARY INCREASES IN THE FEDERAL DEPARTMENT OF AGRICULTURE**

It is evident that the work of the United States Department of Agriculture will suffer seriously, if not irreparably, unless marked increases of salaries can be effected soon. Your Committee recommend that the Association urge upon Congress such increases.

#### **STAFF CHANGES**

To an increasing extent changes in the various staffs of our institutions are taking place on short notice and at such times during the year as seriously to interfere with institutional work. Your Committee recommend that the following procedure be followed by the member-institutions in this Association relative to seeking the services of men already employed in other institutions:

That the head of the institution making the approach for employment communicate with the head of the institution of which the candidate is a member, stating the proposition to be made to the candidate.

That no releases during the normal year of service be requested or granted except in cases of emergency and then only on official request of the head of the institution seeking the services of the candidate.

#### **INTERNATIONAL COOPERATION IN EDUCATION**

Among other bodies, the Educational Corps Commission of the American Expeditionary Forces has urged international cooperation in educational affairs. Your Committee recommend to the Association its endorsement of the following statement of the Educational Corps Commission:

"Provision should therefore be made for the cooperation of universities, colleges, schools and all other educational agencies of the world; for a wider extension and improvement in methods of teaching modern languages; for the more adequate teaching of modern history and of geography; for the encouragement of educational news service. To these ends there should be established both a permanent bureau of education in the League of Nations and means by which frequent and largely attended educational conferences may be held, in which the widest possible applications of the principles of democratic education may be discussed by all the peoples."

#### **WORLD AGRICULTURE**

There was held early last June at the American Expeditionary Forces University in Beaune, France, a conference on world agriculture, with representatives in attendance not only from the United States, but from Great Britain, France and Belgium. We recommend to this Association its endorsement of a statement made by the international representatives just mentioned, as follows:

"It is advisable that there should be constant interchange of ideas and plans among those engaged in the agricultural industry; and all agencies for rural improvement, technical, scientific, economic and social, should be correlated on a world basis. In order to correlate these activities, there

should be frequent conferences of teachers and educational administrators, with special studies of methods of teaching and of administration."

#### INTERNATIONAL RELATIONS IN AGRICULTURAL EDUCATION

It is a peculiarly opportune time to establish more frequent and more permanent international relations in agricultural education. It is desirable that there should be more than an occasional exchange of prominent lecturers and particularly that there should be a regular interchange of students. A special request from the Director of the Institute of Agronomy in Paris has come to the attention of your Committee relative to the possibility of placing French students in American Agricultural Colleges. There are many other items of cooperation that could be effected. One of the present difficulties is the absence of a clearing house by which these matters can be handled.

Your Committee therefore recommend that this Association take the proper steps to secure, if possible, the appointment of an officer, or the organization, if necessary, of an office or bureau in the United States Department of Agriculture to deal with those problems of international cooperation in agricultural affairs, including the exchange of lecturers and students, mentioned in preceding sections of this report.

Respectfully submitted,

SAMUEL AVERY,  
A. R. HILL,  
CHAS. A. LORY,  
R. A. PEARSON,  
W. M. RIGGS,  
K. L. BUTTERFIELD, *Chairman.*

On motion, the report of the Committee on College Organization and Policy was received and referred to the Executive Committee.

On motion, a recess was taken until 9.30 A. M., November 13.

#### MORNING SESSION, THURSDAY, NOVEMBER 13, 1919

The Convention was called to order at 9.30 A. M. by the President.

THE PRESIDENT. The first order of business is the report of the bibliographer, Director A. C. True of the States Relations Service, United States Department of Agriculture.

#### REPORT OF THE BIBLIOGRAPHER

##### IMPRESSIONS OF AGRICULTURAL AND SCIENTIFIC SERIAL LITERATURE IN THE MORE IMPORTANT COUNTRIES OF EUROPE DURING THE WAR

It will be a long time before we shall know fully and definitely in what ways and to what extent the disturbed conditions created by the war have affected the agricultural and scientific serials that used to come to us from Europe. The resumption of old relations has reached a stage, however, at which passing mention may be made of some of the facts that have thus far come to light and of some of the impressions gained from them, although it must be remembered that these are as chance has dis-

covered them and do not represent the result of a systematic and thorough examination of the literature in question.

What constitutes this literature is not fully known. No complete and authoritative information exists concerning the present state of serial publications in the more important countries of Europe. Although fairly complete knowledge of English publications can be obtained, less is known of the French, still less of the Italian, while facts about the Belgian are just beginning to come to light. We have definite knowledge about many of the German publications but of others nothing has been heard. For a long time we have been in complete ignorance concerning Russian serials, and not much more is known of the Austrian, Bohemian and Hungarian. Probably the most representative collection of agricultural literature of this period is that of the International Institute of Agriculture at Rome which enjoyed the advantage of exceptional relations with all belligerent countries. Although the existence of much of this literature is made known through the *International Review of the Science and Practice of Agriculture*, it is, nevertheless, to be regretted that the Institute found it necessary to discontinue at the end of June, 1915, the publication of the *Bulletin Bibliographique* containing lists of accessions to its library. The completion of such a list for the period of the war would furnish a tool of great present usefulness and a document of historical interest. Even from our Allies, periodical mail has not been received with any certainty and regularity, so non-receipt cannot be regarded as evidence of non-publication. It has not always been possible to obtain in this country what is actually known to have been published, nor has the experience of different libraries been alike in this respect, some succeeding in one direction and others in another. If one may judge by chance comment in foreign journals, by material reviewed in them and by their lists of publications received, uncertainty as to what has been published and variable success in its acquisition are also common experiences in the various countries of Europe.

As the impressions here recorded were gained from observations made upon the collection in the Library of the U. S. Department of Agriculture, the following statement is quoted from the forthcoming report of the Librarian for the year 1919, to give some idea of the extent and the limitations of this collection.

"In addition to the 2,493 current periodicals, appearing not less than four times a year, the Library received 3,554 serials of less frequent issue, such as annual reports, proceedings, and transactions published by institutions and societies, a decrease of 350 compared with the previous year. This decrease was due in part to the difficulty in obtaining publications from foreign countries and in part to the fact that it has not been possible to spend as much time on the work of requesting exchanges.

"Through the efforts of the Committee on Importation of the American Library Association, arrangements were made in 1918 whereby American librarians were able to import periodicals from the enemy countries. A considerable number of German periodicals published in 1918 and 1919, which were ordered by this Library, are now being received, though many others known to have been published have thus far not been obtained at all. Furthermore, there are gaps in the files ranging from one to more than three years. The work of completing these will be most difficult, and there is grave doubt whether some of the missing issues can ever be re-



placed, as many of the publications were issued during the war only in limited editions. Moreover, a considerable stock of 1916 and 1917 issues destined for this and other American libraries was destroyed by fire in a warehouse in Leipzig."

Like many other institutions in this country, this Library receives serial publications partly by purchase and partly by exchange, the latter coming either directly by mail or through the International Exchanges Bureau of the Smithsonian Institution. Recent consignments have been received by this Bureau from France, Belgium, Italy and Switzerland, but thus far exchange with Germany, Austria, Hungary and Russia has not been resumed. Shipments have been more or less interrupted because of embargoes, lack of transportation space and facilities, and for other reasons, but it is anticipated that when the present congestion in New York harbor is relieved rapid progress will be made in delivering both in Europe and in the United States the large amount of material that is in passage or is stored awaiting shipment. It is not yet known how many of the societies formerly using the exchange service are still in existence nor how numerous will be the necessary changes in their names and addresses. Russian and Portuguese societies have dropped the word "royal" from their official designations and one or two instances of similar changes in the names of German or Austrian societies have come to light.

Judging from the information available in the Library of the U. S. Department of Agriculture, it seems probable that apart from official and institutional organs, very few of the most important general or special serials which formerly were relied upon for scientific and technical matter of interest to agriculture have actually ceased publication, nor have many failed to preserve their former policies, their general character and make-up, their normal fields of interest or their relative importance in these fields.

Official and institutional publications have been more variable, and less complete data concerning them are at hand. Official publications are affected by changes in organization, both temporary and permanent, which have been made by all European governments and have resulted in the creation of new bodies and in the union of old ones under central authority. Most of these changes are still in force and that many of them relate to agriculture need hardly be said. Although many of the former organs of publication are little changed, some new ones have been created and old ones apparently discontinued. While present forms of organization are still under discussion and criticism, it cannot be predicted what changes, if any, will finally be made in their regular organs of publication. Agricultural experiment stations and teaching institutions, whether in the same or in different countries, appear to have been unequally affected in their publishing activities, and some of them, especially in France, are involved in new plans for agricultural organization, so that it can not be predicted to what extent their former or present organs of publication will be continued or resumed without change.

Almost without exception, scientific serial publications of more than annual frequency of issue show decreased pagination and fewer original articles, and in these a larger proportion of space is devoted to biographical, historical and descriptive matter and to general summaries than to reports of original observation and investigation. The fields of biological chem-

istry, pathology and bacteriology perhaps may be said to have suffered least in this respect, but neither the amount nor the value of the investigational work published in Europe in the last five years can yet be estimated. As far as they have been received, reports of agricultural experiment stations in France, England and Italy indicate that the energies of the reduced staffs of these institutions were largely taken up with additional teaching and advisory duties, and that such research work as could be done was directed mainly to matters of immediate urgency arising from the prevailing conditions and to the continuance of a limited number of investigations which had been in progress for a series of years. Annual publications have not been received from a sufficient number of institutions and societies to make possible any general comparison with those of former years. Of the few that have been received, some have appeared in annual numbers, others have combined the results of two, three, or four years' work in a single volume. The recent history of those institutions and societies not yet heard from has not been investigated and for a long time it will not be definitely known which survive. Neither has inquiry been made concerning a number of the more popular foreign agricultural papers that no longer come to us. The contents of many which are still received show a general reduction of material and the frequent use of reprinted articles from other periodicals or from their own former issues.

Bibliographical information, reviews of periodical literature, etc., are greatly curtailed since their preparation has been hampered, not only by the commonly experienced dispersal of editorial staffs, scarcity of paper and cost of printing, but also because the literature to be reviewed could be secured only from a limited number of sources, and nowhere has a systematic or complete collection of literature in any special field been possible. How seriously the future investigator will be inconvenienced by lack of the usual completeness in these aids to research can only be tested when in the course of time a reasonably complete collection and comparison of both bibliographical and original literature can be made with a view to evaluation of the quality as well as estimate of the quantity of what has been omitted. The International Review of the Science and Practice of Agriculture will probably prove to be the most complete guide to the literature of practical agriculture published in Europe during the war and will include some of its related sciences. As guides to the latter we had come to look upon the German bibliographical journals as indispensable. Such of these as reached the Department up to May, 1916, showed that current literature from other countries was not reaching Germany with sufficient regularity and in sufficient quantities to enable them to approach their former standard of thoroughness in the ground covered. Whether the annual bibliographical organs, such as *Jahresbericht für Agrikulturchemie*, which have not yet been received will cover the ground more completely or whether some other provision has been made for supplementing the weekly or monthly review journals remains to be seen. Some plans are on foot in the allied countries for an international bibliographical enterprise that will cover the whole field of scientific knowledge in a systematic way, but these plans have not yet taken definite form.

Of the individual countries, Belgium is the first to claim attention, not because the publications from within her borders were the most numerous or the most important that came to us before the war, but because we are

eager to know how soon and how clearly surviving leadership and organization in agriculture and science will be able to make themselves heard among all the insistent demands of other and more material interests. It has been gratifying, therefore, to welcome in the past few months the re-appearance of a number of Belgian periodicals issued by scientific societies or agricultural institutions and others of a more popular character. From these it may be concluded that suspension of publication of this kind of literature was practically universal in Belgium from August, 1914, until the spring of 1919. The initial numbers that break this long silence are interesting reading, touching upon the tragic events that brought about their cessation, their struggle to preserve organization and membership, and, where possible, to aid and advise in the difficulties that beset the Nation, and concluding with a hopeful word for the future. Publications of the Société Entomologique de Belgique, Société Centrale Forestière de Belgique, and Institut Agronomique de Gembloux are among those received. As soon as all the necessary facts can be collected, the last named institution purposes to issue a 90-page war number giving an account of its members during the years 1914-1919. While there seems reason to believe that some of the series published by the Belgian Ministry of Agriculture have been resumed, none of these have as yet reached the U. S. Department of Agriculture. Throughout the war, the Minister of Colonies has issued from a London office the *Bulletin du Congo Belge*, and has begun a new series of pamphlets, *Etudes de Biologie Agricole*, four of which have appeared. The columns of the popular agricultural papers contain a surprising number of notices of meetings, local, national and international, in the interests of agriculture and rural life in their various aspects. Exhibitions of various kinds, motor tests, horse and other livestock shows, flower shows, etc., have been numerous. Considerable space is given to refuting charges of profiteering on the part of farmers. Most emphatic in its presentation of the farmers' case in this respect is the weekly *Journal of the newly organized Société Nationale des Agriculteurs de Belgique*, whose first issue is dated May 17, 1919. This society has been formed for the purpose of constituting through a federation of existing practical and scientific associations an authorized representation of the agricultural world, and of promoting a better understanding between rural and urban interests whose relations are becoming more and more strained.

In France, both scientific and agricultural periodicals have, with rare exceptions, a common history of a period of suspension for several months after July, 1914, concluding that year with one or two combined issues. Then followed a period of irregular issue and gradually a more or less complete return to former conditions. Nearly all still exhibit decreased pagination and many are still issued less frequently than formerly. A notable exception to the societies whose activities and publications decreased during the war period is the *Académie d'Agriculture de France*, until March, 1915, the *Société Nationale d'Agriculture de France*. This society, on the verge of reorganization into a body with some official standing, was called upon to aid the government in an advisory capacity in dealing with the many difficult agricultural problems that the war developed. The *Comptes Rendus of the Académie des Sciences at Paris* also appeared with its accustomed regularity throughout the war. Serial publications of the *Institut National Agronomique*, *Ecole Nationale d'Agriculture de Grignon*, and the *Ecole*

Nationale de Montpellier have been continued, though appearing at rarer intervals. *Annales de la Science Agronomique* in a recent issue announces the intention of keeping its review of current publications more nearly up to date and of covering also the literature that appeared in the years 1914 to 1917, inclusive.

Of two or three annual publications which came from regional experiment stations in France before 1914, none have reached the Department, and, in view of the recent organization of French agricultural research and educational institutions into a central system, it is not unlikely that in the future the publication of results of their work will assume new form.

Serial publications in Great Britain also show irregularities, but they were not so seriously affected as those of France and Belgium. There are even some enlargements of old journals and the foundation of new ones to record. The *Journal of the Board of Agriculture* published in London, not only suffered no interruption, but rather exceeds in pagination volumes of earlier years. In 1917, however, after intermittent appearance for some months, the review section, upon which we were accustomed to rely for notice of publications of the various agricultural colleges and experiment stations, was abandoned. From some of these institutions, occasional bulletins or reports have been received, some have reported suspension of publication during the war and from others nothing has been heard. Food Production Leaflets and Guides to Small Holders, both published by the Board of Agriculture, and the *Wages Board Gazette*, published by the Agricultural Wages Board, are new series which are the outcome of war conditions. Another product of war conditions is the *Landswoman*, the *Journal of the Land Army and Women's Institutes* whose first monthly issue is dated January, 1918.

The *Scottish Journal of Agriculture*, issued by the Board of Agriculture for Scotland, and patterned closely after the *Journal of the Board of Agriculture of England*, has been issued quarterly since January, 1918. This includes a somewhat disappointing review of current periodical literature, which proves to consist of extracts from the *International Review of the Science and Practice of Agriculture* but with the unfortunate omission of all citations of the literature reviewed. The Royal Agricultural Society, in addition to its usual annual volumes, has issued several numbers of a new series entitled *Occasional Notes* which will appear from time to time in order to place more promptly before the public some of the information hitherto published only in the annual volumes. Since the war began, two notable review journals—*Veterinary Review* and *Physiological Abstracts*—have begun publication in England. The Society of Chemical Industry enlarged its *Journal* in January, 1918, classifying the subject-matter into three sections, Abstracts, Transactions and Reviews, each of which has its own pagination. The review section includes articles of chemical and industrial interest, trade and other reports, news, correspondence and similar material.

A statement generally applicable to Italian agricultural and scientific serials is not easy to formulate for, while most of them exhibit irregularities due to war conditions, these do not occur in all at the same period, nor are they uniformly followed by a progressive advance toward the normal. In some cases, the period of disturbance has apparently led to suspension of publication, in others it has been recurrent or persistent, and in others there

has been quick recovery. Irregularities are observed less frequently in the first two years of the war and most of the Italian serials pursued a fairly normal course until 1917 or 1918. No publications have been received from the Ministry of Agriculture since 1916, although at least a few more recent numbers of the *Bollettino* are known to have appeared. With a few exceptions, the most important of the scientific journals of interest to agriculture are currently received. Some of the experiment stations have issued separate reports and the *Stazioni Sperimentali Agrarie Italiane* consists as usual of contributions from these institutions.

The uncertainty that has attended the acquisition of German literature during the war was mentioned at the beginning of this paper. The impression seems well founded that none of the standard agricultural, scientific and agricultural periodicals have ceased publication. Their departure from normal appears to have resembled that observed in the serials of other European countries, except that reduction in pagination and frequency of issue proceeded in a more uniform and systematic fashion, without changes in the plan first adopted. Editors of these papers are silent on the subjects of plans for future issue and difficulties encountered, leaving these to the inference of the reader. In these serials, as in those previously described, there is a reduction of original matter and a more frequent use of biographical, historical and descriptive material.

As all exchange of publications has been discontinued, the little that has been received from the scientific and agricultural institutions of Germany does not give sufficient ground for drawing conclusions as to the extent of their publishing activity. The amount of scientific literature, both original and bibliographical, received from Germany before the war was greater than that of any other country. So far the amount received does not justify any critical estimate of the extent to which this condition may be altered.

On motion, the report of the bibliographer was received.

**THE PRESIDENT.** The report of the Joint Committee on Projects and Correlation of Research will now be made by its chairman (on the part of this Association), Dean F. B. Mumford of the University of Missouri. It is understood that this report is made by the association representatives on this joint committee and not by the Committee as a whole.

**F. B. MUMFORD.** The Committee on Projects and Correlation of Research respectfully reports as follows:

#### REPORT OF THE COMMITTEE ON PROJECTS AND CORRELATION OF RESEARCH

The Joint Committee on Projects and Correlation of Research consisting of three members appointed by this Association and three members appointed by the Secretary of Agriculture made a report to the Association on November 11, 1914, recommending a much more complete and thorough correlation of extension, investigative and demonstrational projects which were being actively undertaken by the Federal Department of Agriculture and the State Colleges of Agriculture within the several States. Since the report of this Committee the Department has organized the States Relations Service, the function of which is to promote the cooperation and

correlation of federal and state projects. The correlation of extension projects has made great progress as the result of a mutual agreement, known as the Memorandum of Understanding, submitted to the colleges in June, 1914, by the Secretary of Agriculture following a conference with the Executive Committee of this Association. Under this Memorandum of Understanding all extension projects of whatever nature are subject to cooperative agreement and mutual understanding.

The success of this plan is recognized and generally approved by both parties to the agreement. In a few cases where misunderstandings have arisen it is the belief of your Committee that it is due to individual officers connected with the Federal Department or with the state institutions who have disregarded the fundamental Memorandum of Understanding. The effect of such disregard for the mutual agreement is in fact a return to the original unsatisfactory relations existing before the uniform agreement had been approved.

The Committee on Projects and Correlation representing both the Federal Department and the Association urgently requests the Secretary of Agriculture and the Executive Committee of this Association to insist upon the representatives of the federal and state institutions making the uniform Memorandum of Understanding the basis for all cooperative extension work of whatever nature. It lies within the power of the Secretary of Agriculture and the Executive Committee to enforce this Memorandum and such enforcement at this time will complete the cooperative endeavors which have been successful.

The research projects of the federal and state institutions have not been correlated as yet and are still the subject of individual efforts between the various bureaus of the Department of Agriculture and the departments of the State Experiment Stations. There is at present a lack of uniformity in such cooperative agreements as have been made and unfortunately in some States there exists no sort of cooperation in respect to certain projects. Your Committee is of the opinion that the time has arrived when it is desirable to formulate rather definite plans having for their purpose the development of more uniform cooperative agreements in respect to research projects.

A questionnaire was mailed by the Committee to federal bureau chiefs and to station directors. A study of the replies seems to justify the following conclusions regarding the present status of cooperative research work. There has been notable improvement in the quality of research work in the Federal Department and in the Stations in respect to the better training of investigators, the more fundamental character of investigations and in the better quality of scientific publications. The majority of station directors are of the opinion that there is a tendency to undertake too many projects with the funds available and that this distinctly militates against the quality of research work.

There is evident a material increase in the cooperation of departments within the station. This development is in part due to the planning of Adams fund projects which are broad in scope and often cover a wide field of scientific endeavor. There is uniform agreement that this tendency is growing and that a still further increase is desirable.

The stations have not as a rule any very definite plans for insuring cooperation but the organization of a station council or a committee on

projects has resulted in better cooperation between the departments. The organization of special groups of investigators interested in the same general subject has been successfully undertaken in some stations. It is the uniform opinion of their administrative officers that regular conferences of men engaged in the same type of work has materially increased the efficiency of the investigational work.

Your Committee attempted to discover if there was any considerable cooperation between the several stations in investigating projects. Practically four-fifths of them report no important cooperation with other Stations, while a small number report such successful cooperation and suggested an expansion of this method of research.

The answers to a number of questions calculated to determine the present status of cooperative endeavors in research projects between the Federal Department and the Stations bring out the general opinion that there is opportunity for material improvement. All of the station directors except two believe improvement is possible in the cooperative relations in research projects. It is, however, true that the Federal Department and the Stations are now cooperating in a very large number of projects. Their mere mention is impressive. The subjects of cooperation reported by station directors include research projects in farm economics, marketing, animal nutrition, effect of feed on quality of meat products, chemical composition of milk, soil survey, soil and plant pathology, plant nutrition, tobacco, flax, sweet corn, potato, hemp and fiber, sugar beet improvement, alfalfa seed production, grazing, fruit breeding, horticulture, botany, dairy, irrigation and drainage, improvement of muscadine grape, parasitic fungi on corn, gypsy moth, white pine blister, insect disease control and many others.

The cooperative relations of the Federal Department and the Stations are, according to the opinions of administrative officers, in some cases highly successful and satisfactory. It is apparent, however, that in the majority of states a feeling exists among station directors that while the situation is improving there is need for much better understanding and of more uniform plans for correlating the activities of these two great agencies of research. While recognizing the difficulties incident to a better coordination of research work it is nevertheless the opinion of the great majority of these administrative officers that it is possible greatly to improve the situation by bringing about a somewhat better understanding. The improvements suggested may be roughly classified as follows:

1. Subject-matter. There is opportunity for differentiating between the subjects of investigation which lend themselves more readily to co-operative effort and to the adoption of a Memorandum of Understanding which will prevent duplication of effort within a state.

2. Personnel. It is evident that no mere machinery for cooperation can completely solve the problem. Cooperation involves friendly relations between individual investigators and if the personality of investigators is such that they will not cooperate, then we shall continue to have dissatisfaction, lack of harmony and a loss of efficiency.

3. Administration. It is generally recognized that cooperative relations are much more satisfactory with some bureaus and with some stations than with others. There is quite general agreement that the administrative officers of some bureaus are opposed to any real cooperation in research

projects. It is also true that a few stations are opposed to cooperating with the Federal Department.

The suggestion has been made that there be organized within the Department of Agriculture a bureau or office which will exercise the same function with reference to research projects that the States Relations Service now exercises in all extension projects. This plan, if carried out, would undoubtedly result in preventing duplication of work and would probably obviate a certain amount of friction. Such a step would also place the stamp of approval on all efforts to bring about better cooperation in investigational work. There are two objections to this plan. The most important defect is that the experiment stations would have no representation in the proposed administrative machinery and that, therefore, the plan could not be said to be truly cooperative. This proposal is also open to the objection which may be properly urged against all similar efforts toward administrative regulation of research, that it would have a tendency to discourage individual initiative. Investigational work cannot be subjected to bureaucratic methods of administration.

A much better plan would be to organize an agricultural research council consisting of representatives from the Federal Department and the Stations. This council should have permanent headquarters in Washington and work under the administrative direction of the Secretary of Agriculture and the Executive Committee of this Association. Its function should be to make a careful study of the research activities of the two cooperating agencies with a view to coordinating and, where desirable, correlating the investigative projects now active. It is probable that in many cases it is not desirable to disturb existing relations by attempting to bring about any sort of correlation. The chief opportunity and the particular purpose of this council of research would be to endeavor to establish desirable cooperation and correlation of all new projects.

The first duty of this proposed council would be to make a careful survey of the research activities of the Department and the Stations. The prevailing opinion of a large majority of investigators is that there is now a significant loss of efficiency in agricultural research because of a complete lack of correlation. The facts gathered by the council in the proposed survey would furnish the only accurate basis for an intelligent decision as to whether the prevailing opinion is correct. On the basis of this survey the council would undertake to formulate plans for coordinating and correlating the research work of the several stations and of the Department.

The personnel of the council should be determined by the Secretary of Agriculture and the Executive Committee of this Association. The state representatives would be selected from among the station directors or research workers. It is assumed that institutions would readily grant leaves of absence for this important national service.

No one will undertake to deny that many research projects now active have been planned by men of limited training and often involve very difficult chemical or physical phases which can be successfully undertaken only by men of the most fundamental training. One result of the successful development of this plan would be an opportunity for the research worker of outstanding ability to render a national service by aiding less well trained and efficient investigators in the formulation and conduct of important research work.



In order to make the latter portion of this report specific, this Committee definitely recommends that this Association authorize its Executive Committee to confer with the Secretary of Agriculture with a view of providing for the organization of an Agricultural Research Council, which, when organized, should in its personnel represent both the Federal Department of Agriculture and the State Colleges and Experiment Stations, the function of which should be to help establish the fullest correlation and cooperation among the several institutions. It is believed that the proposed council will make more effective the existing research machinery, will bring out in clearer relief the problems and methods of agricultural research and will help to conserve the funds and the energies now assigned to investigations in the field of agriculture.

Respectfully submitted,

F. B. MUMFORD, *Chairman*,  
J. G. LIPMAN,  
W. R. DODSON.

On motion, the report of the Joint Committee on Projects and Correlation of Research was received and referred to the Executive Committee.

A. C. TRUE. As a matter of information, bearing on this subject, I might call attention to the phraseology of that portion of the agricultural appropriation bill referring to the States Relations Service in respect to its administration of the Hatch, Adams and Smith-Lever Acts, wherein it is specified that the Secretary of Agriculture shall prescribe the form of the annual financial statements required under the provisions of these Acts in order that he may ascertain whether or not the expenditures in any given case have been made in accordance with their several provisions. In this portion of the measure in question occurs this significant phraseology: "To coordinate the work of the Department of Agriculture with that of the State Agricultural Colleges and Experiment Stations along the lines authorized in said Acts."

Now such coordination has been worked out with reference to the work carried on under the Smith-Lever Act, but no similar arrangement has thus far been put into operation with reference to the work carried on under the Hatch and Adams Acts.

#### AMENDMENT OF THE CONSTITUTION

THE PRESIDENT. The next order of business is the consideration of the proposed constitutional amendments (Thirty-second Proceedings, pages 69-74, 131-133). In conformity with the requirements of the Constitution, these proposed amendments "have been repeated in the call for the Convention." The Secretary has received the credential lists of the official delegates from the various institutions, signed by the presidents or other executive officers. Unless the Chair hears objection, the roll of the Convention for voting purposes will be made up from this official list. The membership of the Association for voting purposes is made up of "institutions," namely, colleges *per se* and experiment stations *per se*, each college as such being entitled to one vote and each experiment station as such to one vote (Twenty-eighth Proceedings, pages 139-142). The Federal Bureau of Education, the Federal Department of Agriculture and the Office of Ex-

periment Stations of the last-named Department are each entitled to cast one vote. Attention is called to item (2) under "Membership" in the Constitution wherein it is set forth that while "the same delegate may represent both a college and a station, (he may) vote in only one section and shall cast only one vote in general sessions." The Chair assumes that institutions whose official representatives are not present during the consideration of this matter of constitutional amendment lose their votes.

The Committee which prepared the proposed amendments was led by President W. E. Stone of Indiana. Consequently, in making up the program of this Convention, the Executive Committee very properly has designated President Stone to present this matter and to lead in the discussion.

W. E. STONE. May I review very briefly the history of this movement? The land-grant college presidents have often discussed the advisability of the reorganization of this Association and of constitutional changes, discussions which culminated at the last Convention in the presentation to the Association of a report (Thirty-second Proceedings, pages 69-70) in which are fully set forth the impelling reasons for these proposed changes. These may be summarized in three paragraphs as follows:

1. A change in the name of the Association indicative of its present broader scope.
2. The lodging of its legislative functions in the hands of the land-grant college presidents.
3. The retention of the present sectional organization of the Association for purposes of discussion, recommendation and report to the legislative body of the Association.

These proposed changes necessitate certain verbal alterations in several parts of the Constitution, but if we keep in mind these fundamental purposes it will make our consideration of the whole matter easier. The Committee has no special aim or desire except to bring about these changes, if that is the will of the Association.

On motion, it was voted that the proposed constitutional changes be considered article by article.

THE PRESIDENT. Attention is called to the provisions of the Constitution touching amendments which permit changes to be made in that instrument "by a two-thirds vote of the delegates present." Attention is also called to the fact that propositions of amendment are "subject to modification and amendment in the same manner as other propositions."

W. E. STONE. Article 1 of the present Constitution reads as follows: "Name: This Association shall be called The Association of American Agricultural Colleges and Experiment Stations." The Committee recommends that it be amended to read as follows: "Name: This Association shall be called The Association of Land-Grant Colleges."

On motion, the amendment was carried.

W. E. STONE. Article 2 of the present Constitution deals with the objects of the Association. The Committee recommends that it be amended by the substitution of the word "institutions" for the words "colleges and

stations" in the third line of the Constitution as printed in the Thirty-second Proceedings, page 16.

On motion, the amendment was carried.

**W. E. STONE.** Article 3 of the present Constitution deals with the membership of the Association. It includes four paragraphs, the last two of which are left unchanged by the committee's report, the first two of which are profoundly changed. These two paragraphs at present read as follows:

#### MEMBERSHIP

"(1) Every college established under the Act of Congress approved July 2, 1862, or receiving the benefits of the Act of Congress approved August 30, 1890, and every agricultural experiment station established under state or congressional authority, the Bureau of Education of the Department of the Interior, the Department of Agriculture, and the Office of Experiment Stations of the last named Department, shall be eligible to membership in this Association.

"(2) Any institution a member of the Association in full standing may send any number of delegates to the meetings of the Association. The same delegate may represent both a college and a station, but shall vote in only one section, and shall cast only one vote in general sessions. Other delegates may be designated by any institution to represent it in specified divisions of the sections of the Association, but such delegates shall vote only in such divisions and no institution shall be allowed more than one vote in any sectional meeting."

The Committee recommends that these two paragraphs (1) and (2) be amended to read as follows:

#### MEMBERSHIP

"(1) Every college established under the Act of Congress approved July 2, 1862, or receiving the benefits of the Act of Congress approved August 30, 1890, shall be eligible to membership in this Association, provided that any agricultural experiment station not now connected with one of the above named colleges, but receiving the benefits of the Act of Congress approved March 2, 1887, shall also be eligible to membership.

"(2) Any institution a member of this Association in full standing may send any number of delegates to the annual convention of the Association."

**J. G. LIPMAN.** There are two experiment stations in New Jersey, both located at Rutgers College, the "State Station" established in 1880 and the "Agricultural College Station" established in 1888. They are governed by separate boards of control and in the main their staffs are different, but they are under one director, for the present at least, although this condition may not be permanent. The state station does not "receive the benefits of the Act of Congress approved March 2, 1887." What would be its status under the proposed amendment? Apparently it would be barred out.

**THE SECRETARY-TREASURER.** The treasurer's office for the past six years has submitted but one bill for dues to the New Jersey Agricultural Ex-

pertment Station as such, and but one dues has been paid. Prior to that time bills were sent to and paid by each of the two stations.

**J. G. LIPMAN.** It is my impression that I have approved the payment of dues from state funds.

**EUGENE DAVENPORT.** I am sure that it is not the wish of the Association to bar anybody from the benefits of membership. It is not a question of the status of the New Jersey stations as such but of the fitness of things. The question is, rather, what form the Association as a whole should take.

**ALFRED VIVIAN** of Ohio. Will the Federal Department of Agriculture and the Federal Bureau of Education be included within our membership under the revised Constitution? Much of the success of this Association in the past has been due to their cooperation. Their exclusion would be most unfortunate. Might they not be directly included?

**W. E. STONE.** The proposed amendments contemplate their membership in the sections for purposes of discussion and the participation of their representatives in the general sessions of the Association. I should assume that their representatives would stand on an equal footing with "directors, deans or other administrative heads" as proposed in the amendment next to be considered under "Sections (2)," paragraph 3.

On motion, the amendment was carried.

**W. E. STONE.** Article 4 of the present Constitution deals with "Sections." It provides, as is well understood, for three sections, on college work and administration, on experiment station work and on extension work; defines their membership; relates the representatives of the Bureau of Education, the Department of Agriculture and the Office of Experiment Stations to various sections; permits the creation of sectional divisions, etc. (See Constitution as printed in Thirty-second Proceedings, pages 16-17).

The Committee recommends the substitution of the following phraseology in lieu of the entire Article 4, entitled "Sections."

#### SECTIONS

"(1) The executive section of the Association shall consist of the presidents or executive officers of the institutions having membership in the Association. The executive section shall be the legislative body of the Association.

"(2) Departmental sections shall consist of the following: A section of agricultural experiment stations; a section of agricultural extension; a section of engineering; a section of home economics; and such other sections as may from time to time be approved by the executive section.

"The departmental sections shall communicate their recommendations and reports to the executive section.

"The membership of the departmental sections shall consist respectively of the directors, deans, or other administrative heads of these respective departments or divisions of the institutions having membership in the Association."

This substitution undertakes to classify the sections but does not undertake particularly to specify the method of the conduct of their business, which seems to the Committee to be unnecessary. The Committee has no particular desire in regard to the number of sections but thought it wise to make provision for all sections and divisions now existing, placing them all upon the sectional basis, leaving the matter to this general session to modify its recommendation if it sees fit to do so.

ALFRED VIVIAN. I move as a substitute for that portion of the committee's report now under consideration the following:

"The Association shall consist of an executive body and three departmental sections, a section of agriculture, a section of engineering, and a section of home economics; and such further sections as may from time to time be approved in general session.

"The executive body shall consist of the presidents of the institutions having membership in the Association or their properly detailed representatives.

"The executive body shall meet at the close of the final session to act upon all matters reported from the general session and to discuss matters of general policy and interest.

"The members of the departmental sections shall consist respectively of the directors, deans, or other administrative heads of the respective departments or divisions of the institutions having membership in the Association and the corresponding officers of the Department of Agriculture and the Bureau of Education; provided that any institution may designate some other person to represent it in any departmental section.

"Members of these three sections (and no others) shall be entitled to vote both in general sessions and in the section to which they respectively belong.

"Each section shall conduct its own proceedings and shall keep a record of the same, and no action of a section, by resolution or otherwise, shall be valid until the same shall have been ratified by the Association in general session."

The effect of this proposed substitute for the committee's report would be to give to the "executive body" all the standing that the "executive section" possesses in the proposed revised constitution and would limit the sections to three in number. The section of agriculture is made one section by this proposed substitution because of the feeling that agriculture can not really be separated into college, station and extension work, that the three must live or die together. Every station man should be interested in resident teaching and extension work, every extension man in resident teaching and research, every resident teacher in both extension and research.

The committee's proposals practically do away with the general sessions, whereas if this substitution prevails any matter germane for discussion and any resolution may be brought into general sessions as at present and accepted or rejected, becoming valid, however, only on approval by the executive body. I use the term "body" designedly in order to distinguish it from the sections.

The motion was duly seconded.

W. H. JORDAN. I have been a member of the Executive Committee for 16 years. My experience in this Committee and in the Association proper leads me to favor this substitution. For one thing, it greatly simplifies the

extreme difficulties the Executive Committee has always faced in making up the convention program. Then again, I find that I know little of what is being done in the various sections, yet I am interested in resident teaching and extension as well as in research. Furthermore, the college presidents have a direct and definite responsibility in all these directions and they should hear discussions which they now can not hear because of our extreme subdivision. I do not believe that the substitution for the committee's report would in any way interfere with any of our legitimate efforts. I feel that it would promote the spirit of conference and discussion, that it would enable the Executive Committee to stress at one convention certain lines of work and at the next another, and that it would relieve some of the colleges of the financial difficulties involved in sending large numbers of delegates to the conventions. Therefore, I most heartily approve this suggestion to solidify agriculture in its organization and discussion before this body.

A. F. Woods. College executives ought of right to listen to the discussions of important matters of general interest held in the sections. Hence it seems to me that the adoption of this substitute to the committee's amendment is advisable and that, if it is adopted nothing is lost and much is gained.

D. J. Crosby of New York. The general session in which in the past not only the executives but the workers have mingled and threshed matters out is a valuable feature of this Association, which should be maintained for the general discussion of the larger institutional problems. The final power will still rest with the college presidents.

I note that the committee's proposals do not contemplate institutional representation in the absence of the president or other executive officer. Is it intended that accredited representatives may not act for an institution in the event of the president's absence?

W. E. Stone. Dean Vivian's suggestions in the main seem to make for greater efficiency. Three sections are as well as or better than five. I see no serious objections to his proposition as a whole.

The Executive Committee may now arrange programs as it sees fit, may provide for general sessions and for section meetings. This I take it is true whether the committee's proposals for amendment are passed as such, or whether Dean Vivian's suggestions are adopted. I may say, however, that the committee omitted much of the matter in the present constitution under the head of "Sections (2)," for the reason that it is more or less obsolete. Now if the language of this portion of the Constitution is to be retained as is proposed by Dean Vivian, other changes not covered by his suggestion would have to be made. The committee feels that the Constitution should be general in its nature and not specific. The trouble with a recent amendment to the Federal Constitution, in my opinion, is that it inserts regulatory law into that instrument which does not logically belong there. The Committee feels that the specific regulation of the conventions should be left to the Executive Committee.

Touching Mr. Crosby's criticism, I would say that the committee attempted to express by its phraseology the desire of the college presidents for limited membership in the executive session. As a matter of fact, many

college executives, particularly those of our larger institutions, have not attended our meetings in the past, having been represented, as it were, by proxy. If effective voting membership in this Association is limited to the presidents, larger numbers will be likely to attend. To permit representation by proxy, in my opinion, would defeat an essential purpose of the proposed changes.

**ALFRED VIVIAN.** My heart is not set on presidential representation by proxy. I quite agree with President Stone that every land-grant college president should attend the conventions of this Association, but the fact remains that the presidents of several of the large State Universities rarely do attend. If they will come, well and good; but if they will not come, should their institutions remain unrepresented?

It should be noted, however, that while the committee's proposed amendment provides that the Executive Committee shall make up the convention program, as a matter of fact the general session is obliterated because it is provided that every action taken by a section shall be reported directly to the executive body. In my judgment, all action taken in the sections should be open for discussion by the entire Association before it passes to the executive body. If the committee's proposed amendment as now worded is adopted, the general session would have nothing to do but to listen to addresses.

**E. A. BURNETT of Nebraska.** If the station and extension sections are eliminated and consolidated as a section of agriculture, inevitably station and extension matters will be sidetracked, only the deans of the Colleges of Agriculture will attend and future programs in the main will deal with problems of college administration. I am frankly skeptical of the wisdom of such a change. Would not so profound a change tend to increase the number of regional conferences held by the States Relations Service people with our extension service people, at which many matters of vital importance are brought up and determined, concerning which college administrators are often ignorant, to which they often give no consideration whatsoever? May not practices be thus introduced which possibly might be modified to advantage before they were put into operation if they had been presented for discussion to the college executives rather than solely to extension directors?

**K. L. BUTTERFIELD.** I like Dean Vivian's suggestions as a whole but would call attention to two points. It is argued that the college presidents would better understand what is going on in the Association along agricultural lines if all agricultural sections were combined. But, you must remember, that his substitution still provides for three sections in three major lines of work, namely, agriculture, engineering and home economics. Obviously this argument should not be pressed too far.

Dean Burnett's point is well taken. Before long not only in agriculture but also in engineering and home economics, these three main interests, resident teaching, research and extension, will come to the front. We must recognize that sooner or later those engaged in each type of work will want to get together on their own specific problems. For example, the agricultural extension people will want to discuss their own pressing administrative questions and they are going to discuss them. We may as well

face that fact. We have never adequately considered teaching methods in this Association. They will be discussed during the next decade far more than they have been in the past and such discussions will extend into all three fields, agriculture, engineering and home economics.

It is obvious that if absenteeism on the part of the presidents of our State Universities becomes a confirmed habit, the "executive body" of this Association will become an executive meeting of the presidents of the separate Land-Grant Colleges. Perhaps in the future we may expect that all the presidents of all the land-grant institutions will attend our conventions. I certainly hope so. Consequently, I favor President Stone's suggestion that the phraseology in Dean Vivian's proposed substitution, looking toward the permission of proxies be eliminated, and I so move.

**W. J. KERR.** This substitute to the amendment and the amendment to the substitute to the amendment present more than we can clearly keep in mind. In order to expedite action, it would seem advisable to pass upon each paragraph seriatim. Suggested changes could then be considered more intelligently.

**THE PRESIDENT.** Unless objection is offered, the further consideration of this matter will proceed upon that basis.

**W. E. STONE.** Touching paragraph (1) under "Sections," in the committee's proposed amendment (page 69).

The committee spent much time over this phraseology and discussed the use of the word "section." It was not well satisfied with the results. Dean Vivian suggests the substitution of the phrase: "executive body" for "executive section." That is a dignified term and if it does not convey the idea of something that is defunct, I would have no objection to it. The word "division" appeals to me.

**A. A. POTTER** of Kansas. I suggest the phrase "executive council."

**W. J. KERR.** Terminology is unimportant so be it that the function of this particular division of the organization is shown to be legislative in character. It is important that the land-grant college presidents have an opportunity annually to confer as to various matters of importance relating to their institutions and to legislate as a result of such conference.

**W. E. STONE.** My suggestion is now that the first paragraph of the proposed revision of the Constitution under "Sections (1)" be changed to read as follows: "(1) The executive body of the Association shall consist of the presidents or executive officers of the institutions having membership in the Association. The executive body shall be the legislative branch of the Association."

**A. D. CRILE** of New Mexico. I am sure the college presidents do not wish to attend conventions of this Association simply in order to legislate. They want to learn through council and conference. Those of us who are relatively new in the work seek advice touching administrative problems of the older men who have been long in service. They will want to attend section meetings in agriculture, engineering and home economics, to try to understand what is going on, to learn what deans and directors are doing



in their respective fields. The organization in the future will be a forum for discussion as well as, perhaps full more than, a legislative body.

ALFRED VIVIAN. I appreciate that this executive body should pass not only on all matters considered in the sections but should also deal with questions of general policy and interest. Of course college presidents will want an opportunity for discussion.

Before I vote upon the last suggestion made by President Stone, may we not have an interpretation of the phraseology "the executive body shall be the legislative branch of the Association?" Two or three fundamental ideas are in my mind touching these proposed revisions. In the first place there are the three sections whose recommendations are to be reviewed and passed upon by the general session. If the general session rejects a proposition made by a section, its rejection is final; if, however, it approves it, the section's action together with the general session's approval, passes for final action to the executive body. If, now, President Stone's latest suggestion eliminates the general session as a distinct feature of the Convention, if its power to pass upon recommendations from the sections is denied, I can not favor the proposition as now advanced.

W. E. STONE. I will now make the following suggestion which I think may cut the Gordian knot.

(a) That the first paragraph of the proposed amendment to the Constitution under "Sections" be modified to read as follows:

"(1) The executive body of the Association shall consist of the presidents or executive officers of the institutions having membership in the Association. The executive body shall be the legislative branch of the Association."

(b) That the second paragraph of the proposed amendment under "Sections" be modified to read as follows:

"(2) Sections shall consist of the following: A section of agriculture; a section of engineering; a section of home economics; and such other sections as may from time to time be approved by the executive body.

"The sections shall communicate their recommendations and reports to the general session which shall in turn report to the executive body.

"The membership of the sections shall consist respectively of the directors, deans and other administrative heads of their respective departments or divisions of the institutions having membership in the Association and of similar divisions of the United States Department of Agriculture and the Federal Bureau of Education."

ALFRED VIVIAN. I move the adoption of the amended article on "Sections" as read.

The motion, being duly seconded, was carried.

F. S. HARRIS of Utah. Discussions for many years have centered around the subject-matter of administration. Now we have created three sections in each of which administrative matters dealing with either resident teaching, research or extension may be discussed. We will inevitably have not three sections but three sections with three subdivisions, or nine in all. The action just taken has not simplified our little cosmos but made it even more complex.

W. E. STONE. We should keep in mind, of course, that the Executive Committee can make any kind of program it chooses. Furthermore, there is nothing in the action we have taken which will serve to prevent any of the delegates getting together and discussing anything they please. Such meetings, whether formal or informal, can be provided for at any convention.

Article V of the present Constitution dealing with "Meetings," provides for the annual conventions, special meetings, etc. (Thirty-second Proceedings, page 17).

The committee recommends no change in the first paragraph but suggests the elision of the entire second paragraph and the substitution in lieu thereof of the following:

"(2) The annual Convention of the Association shall comprise one or more meetings of the executive section to which shall be referred all business of the Convention requiring legislative action.

"Meetings of the departmental sections for the discussion of administrative matters pertaining to their respective lines of work shall be provided for in the convention program.

"General meetings of the Convention shall be held as designated by the Executive Committee."

This amendment provides for all sorts of meetings. In harmony with the action previously taken, the word "section" should be changed to read "body" and the words "departmental" and "administrative" should be elided; and I so move.

The motion, being duly seconded, was carried.

On motion, the proposed amendment was adopted.

W. E. STONE. Article VI of the present constitution dealing with "Officers," provides for the election of president, vice-presidents, secretary-treasurer, bibliographer, executive committee and sectional officers and indicates the method of election and qualifications for office (Thirty-second Proceedings, page 17). The committee recommends the elision of the entire article and the substitution in lieu thereof of the following phraseology:

#### OFFICERS

"(1) The officers of the Association shall consist of a president, vice-president, and secretary-treasurer, to be chosen by the executive section. The president and vice-president shall be chosen from the members of the executive section.

"(2) Each departmental section shall elect its chairman and secretary.

"(3) An executive committee of five members shall be chosen by the executive section, of which committee three members shall be chosen from the executive section and the remainder at large."

In harmony with the action previously taken, the word "body" should replace the word "section" wherever used in conjunction with the adjective "executive"; and the word "departmental" should be elided; and I so move.

The motion, being duly seconded, was carried.

ALFRED VIVIAN. I wish that the second sentence in the first paragraph reading as follows: "The president and vice-president shall be

chosen from the members of the executive body" might be stricken out. This Association has been presided over by several capable men who were not college presidents; for example, W. A. Henry, formerly of the University of Wisconsin; L. H. Bailey, formerly of Cornell University; Director A. C. True of the States Relations Service; Eugene Davenport of the University of Illinois; and there are still men among us of equal caliber who are not college presidents. Since the legislative authority is now clearly vested in the college presidents, they certainly will not object to the occasional recognition of a dean or director as the president of the Association.

Furthermore, I would eliminate the last clause of the first paragraph under (1), reading "to be chosen by the executive body" and I would substitute for paragraph (3) the following phraseology: "An executive committee of five members shall be chosen, three of whom shall be chosen by the executive body and two elected by the general session in the manner prescribed for the election of president, vice-president and secretary-treasurer."

My idea is to retain the present method of election of officers in the general session upon nominations from the floor and that two members of the Executive Committee should be thus elected. The majority of the Executive Committee would still be chosen by the college presidents, but the general session would thus have an opportunity to signify its choice in the case of two members of the Executive Committee.

K. L. BUTTERFIELD. Will not Dean Vivian divide his proposed amendment? I would like to vote for the first proposition but must vote against the second.

ALFRED VIVIAN. Certainly. I move that the phraseology of the present Constitution under the title "Officers" be maintained in so far as it relates to the election of the president, vice-presidents, secretary-treasurer and bibliographer by ballot upon nomination in general session (Thirty-second Proceedings, page 17, "Officers" [3]).

K. L. BUTTERFIELD. I second the motion.

THE SECRETARY. The adoption of this suggestion would involve as in the past the annual election of five vice-presidents for whom the Association has no more need than has a cat for five tails.

EUGENE DAVENPORT. The president is not a member of the Executive Committee. He is not called upon to speak for the Association except at the annual convention. The Executive Committee is its *ad interim* business body. We are always sure to be properly represented by this Committee before Congress and elsewhere. It seems to me that if the restriction as to the presidency were removed, Dean Vivian's point would be covered.

W. E. STONE. The suggested elimination of the last sentence in the committee's proposed revision under (1) is entirely agreeable to me. I question, however, the advisability of the election of the officers by the general session rather than by the college presidents, acting as an executive body.

K. L. BUTTERFIELD. When I seconded Dean Vivian's motion, it was

with the understanding that it covered merely the elimination of the second sentence under (1) in the committee's recommendation. I now understand, however, that as a matter of fact his motion contemplates the retention of the present method of election of the officers. What I would like myself to vote upon is the question of the elimination of the second sentence, leaving the first sentence as stated by the committee to stand as it is.

Hence I withdraw my second to Dean Vivian's motion and move as a substitute therefor the elision of the sentence reading: "The president and the vice-president shall be chosen from the members of the executive body."

ALFRED VIVIAN. This disposition of the matter does not meet the situation as I see it. It would settle once for all the fact that the officers are to be chosen by the executive body. I prefer their election by the general session.

The motion, being duly seconded, was carried.

W. E. STONE. The recommendation of the committee touching the officers of the Association as amended by the vote just taken now reads as follows: "(1) The officers of the Association shall consist of a president, vice-president and secretary-treasurer, to be chosen by the executive body."

It should be remembered that membership is now lodged in the colleges established under the Morrill Act and in certain separate experiment stations, and that the legislative body of this Association is made up of the presidents or executive officers of these institutions. Dean Vivian's suggestion is that its officers be elected by a body other than the legislative body. This seems inconsistent. Each section may elect its own officers but the executive officers of the entire Association, according to this proposition, are to be elected by the general session rather than by the executive body to which primarily they are responsible.

ALFRED VIVIAN. I now move that paragraph (1) of the article on "Officers" as now submitted by the committee be still further amended by the elision of the clause "to be chosen by the executive body" and the insertion in lieu thereof of the words "to be elected in general session."

EUGENE DAVENPORT. This is an association of colleges as now constituted and not a delegate association; but a college may send any number of delegates to a convention. Now the question is, shall its executive officers be chosen by the institutions or by the delegates? Apparently Dean Vivian wishes them to be chosen by the delegates.

W. H. JORDAN. I fail to see what difference it makes. The voting delegates will constitute the general session for voting purposes and they and only they will have a right to vote in the executive body. Regardless of how the Constitution is worded at this particular point, the result will be the same in either event.

The motion, having been duly seconded, was lost.

On motion, paragraph (1) under "Officers" as amended, reading as follows: "The officers of the Association shall consist of a president, vice-president, and secretary-treasurer to be chosen by the executive body" was adopted.

W. E. STONE. Paragraph (2) of the article on "Officers" as proposed by the committee reads as follows: "Each section shall elect its chairman and secretary."

On motion, the amendment was carried.

W. E. STONE. Paragraph (3) of the committee's suggested amendment of the article concerning "Officers" reads as follows: "An executive committee of five members shall be chosen by the executive body, of which committee three members shall be chosen from the executive body and the remainder at large."

On motion, the amendment was carried.

W. E. STONE. The committee recommends the following verbal changes in the present Constitution.

Under "Finances" (Thirty-second Proceedings, page 18) the elision of the words "in general session" in the first line.

Under "Rules of Order," (1) and (2) (Thirty-second Proceedings, page 18), the elision of the word "convention" in the second lines of each paragraph and the substitution in lieu thereof of the word "Association."

On motion, the amendment was carried.

W. E. STONE. The committee recommends in connection with the article on "Amendments" (Thirty-second Proceedings, page 18) that for the present phraseology: "This Constitution may be amended at any regular convention of the Association by a two-thirds vote of the delegates present, if the number constitutes a quorum" there be substituted the following phraseology: "This Constitution may be amended at any regular convention of the Association by a two-thirds vote of the executive body, if the number present represents a quorum of the membership."

On motion, the amendment was adopted.

W. E. STONE. The question now arises as to what is meant by the term "quorum." It is defined neither in the present nor in the amended constitution.

E. A. BURNETT. I move that a majority of the institutions entitled to representation be deemed a quorum.

The motion was seconded.

R. A. PEARSON. I do not believe that the Constitution should be amended by a two-thirds vote of one-half of our membership. I therefore move as a substitute that two-thirds of the institutions entitled to representation be deemed a quorum.

The amendment to the motion was seconded.

EUGENE DAVENPORT. Has there ever been a time when two-thirds of the land-grant college presidents have attended a convention?

THE SECRETARY. Eighty-nine of the 103 institutions constituting this Association are represented at this Convention. Thirty-six of the 51 univer-

sity or college presidents have registered and three of the four directors of separate stations. On the basis of the proposed revised constitution, apparently 51 colleges and four stations would be included in our membership, a total of 55. Thirty-nine is a little in excess of two-thirds of 55.

The motion was defeated.

**THE PRESIDENT.** The question now is upon the original motion made by Dean Burnett that a majority of the institutions entitled to representation be deemed a quorum for the purposes of constitutional amendment.

The motion, being duly seconded, was carried.

**THE PRESIDENT.** I assume that the Association is governed by the ordinary parliamentary rules of order in the matter of determination of quorums for the transaction of ordinary business, in accordance with "Rules of Order," paragraph (7).

Is the Association now ready to adopt the Constitution as amended at this session as a whole? Unless the chair hears objections, it will be assumed that the new Constitution, if adopted, will become operative at the close of the general session on Friday, November 14.

**J. G. LIPMAN.** If not too late, I move to amend paragraph (1) under "Membership" by inserting after the words "March 2, 1887" and before the words "shall also be eligible to membership" the words "or any experiment station under a distinct board of control."

The motion was not seconded.

On motion, the Convention proceeded to vote upon the adoption of the Constitution as amended as a whole, the roll of institutions being called *vis a voce*, with a result as follows: Ayes 52, noes 5.

**THE PRESIDENT.** The present Constitution under which this Convention is meeting does not define a quorum. The Chair understands that heretofore the Association has proceeded on the theory that the majority of the institutions represented and present by their delegates at the time of voting constituted a quorum. The Secretary reports 89 "institutions" represented by accredited and voting delegates, 45 of which number would constitute a quorum. On that basis, I declare the constitutional amendments carried and that the amended constitution will become effective on and from the adjournment of the general session of this Association on Friday, November 14.

On motion, the Chair was authorized to appoint a committee to present to the general session nominations for officers of the new section on agriculture.

On motion, a recess was taken until 8 P. M.

#### EVENING SESSION, THURSDAY, NOVEMBER 13

The Convention was called to order at 8 P. M. by the President.

**THE PRESIDENT.** The first number on this evening's program will be a paper dealing with "Institutional Ethics," by Director W. H. Jordan of New York.

## INSTITUTIONAL ETHICS

By W. H. JORDAN

The moral obligations sustained by the institutions represented in this Association may conveniently be discussed under three heads:

- (1) Obligations to the supporting public.
- (2) Obligations to one another.
- (3) Obligations to their staffs.

It should always be kept in mind that these colleges and stations have been created and subsidized by the State and Nation as coordinated public welfare agencies. It is expected of them that not only shall they aid in conserving our material resources, in developing knowledge and in promoting greater efficiency in the application of human energy to our essential activities, but that they shall also constitute a living and vitalizing force in the human affairs of this Nation, now so sorely beset with great social problems. These are very definite obligations.

On the teaching side of these institutions, whether in the classroom or in extension service, one obligation which should be kept seriously in mind is that the scientific and technical instruction shall be sound, that is, as nearly in accordance with facts and principles as existing knowledge makes possible. There is not the slightest doubt but that the men and women who are giving classroom instruction in these colleges are as a whole sincerely desirous of bringing to their students' minds the most reliable information available. The standard can not be realized, however, if teachers are over-burdened with classroom or laboratory hours or with outside duties. It is especially true of teachers in the fields of the chemical and biological sciences and their applications that they must have abundant time for study.

In this connection, are we not justified in asking whether our semi-political relations, our association with propaganda, our restless activity in public welfare efforts, which are so fully absorbing the energies of the staffs of these institutions are not creating in our Land-Grant Colleges an atmosphere out of harmony with study and reflection, whether, in short, the love of learning and intellectual aspirations are being nourished in our midst? We may well question whether we are best serving even vocational interests if the reaction of the teacher and the atmosphere in which he labors do not inspire in young men a thirst for knowledge and a desire to enlarge its boundaries, because agriculture and the industries, even if these be alone considered, are no less dependent than other vocations upon progress in the whole field of human understanding. Other directors say to me often, "I am looking for my research men in the older colleges and universities." If this is a general attitude, it is significant. It is fair to ask, then, whether in our absorbing pursuit of the practical, we are not in danger of limiting our services in other very important directions. The atmosphere of the classroom and the spirit that dominates the teaching are of vastly more importance to research than the numberless devices in the way of organization that are being constantly suggested to us.

The question of the range of instruction in the Land-Grant Colleges is a pertinent one just now. It can hardly be successfully disputed that so far in the history of this Association, our attention has been held rather closely to the technical side of agriculture and the mechanic arts. The

outlook for the most essential service today is in the field of human relations. While we should not abandon constructive aims in agriculture and engineering, the present critical need is the dominance among us of sound political and social doctrines. Our immediately impending dangers are not wasteful agriculture and faulty engineering, but the insidious spread of economic and social error. The demand is for clear thinking men and women as leaders of the public mind, and these colleges will not fully meet their obligations if they do not take their place in constructive social effort by sending out men and women who are equipped with the fundamentals essential to later wise political and social service, even if they are graduates from technical courses.

We should also be deeply concerned about the popular teaching. The older members of this body can doubtless recall the institute instruction which was given in the earlier days of the attempts at the popular presentation of agricultural knowledge. If their memory is active in this direction, they surely are made to shudder at the looseness and unreliability of many statements that were made. While conditions in this respect have vastly improved, there is still reason for maintaining a conservative attitude in this matter. Because of the stress of keeping apace in our work with national and state appropriations, we are in great danger that out of unripe minds the listening public will be served with error, partial truths and a good deal of undigested material. We should not ask for more extension funds, unless adequately trained men and women can be found to use them. No more unwise policy could be pursued than that of putting additional extension teachers in the field, simply because available funds will permit it. It is possible we do not always adequately measure the economic harm resulting from inaccurate and erroneous statements made by men and women in whom the public has a right to have confidence.

The administrators of experiment stations also have reason for seriously considering their moral obligations. Stations very naturally desire, for obvious reasons, to secure a popular standing with the public and the members of the staff, very properly, seek personal recognition not only with the people but in scientific circles. For these and other reasons several dangers attend the career of an experiment station. The most evident one is a failure to exercise a reasonable conservatism in the publication of conclusions. This is not a fancied danger, even though our scientific caution has strengthened in these latter years. That this is a real danger is made evident by examination of station literature of the past 25 years. It is possible that some institutions and some men exhibit over-conservatism in their utterances, but this is a saving fault, if it be a fault. Estimate, if you can, the economic harm resulting from a conclusion accepted by the public which is unsound in principle. This is a matter which should weigh heavily upon the official conscience of the director of every experiment station. To be sure, it is inevitable that mistakes will be made and that conclusions will be reversed, even after the most conscientious use of scientific judgment.

Another danger, due to the reasons given, is the selection of problems having a popular slant rather than those fundamentally important. This is a decreasing danger, a fact that is due in part to the operation of the Adams Act. We are coming to realize more fully that our obligations under the terms of the Hatch and Adams Acts will only be met by the



severe study of fundamental problems. The selection of problems for study should also be guided by the opportunities for real service rather than by considerations of popularity, the promotion of individual interests, or scientific zeal in special directions.

My original purpose, in presenting this paper, however, which is strictly in harmony with the title under which I am speaking, was to discuss the obligations of these institutions to one another. I have indicated that we represent a group of agencies engaged in a coordinated effort for public welfare. If then we take this broad view and the spirit of patriotism and service abides among us, no institution in this group of educational agencies will be indifferent to the prosperity and efficiency of any other member of the group. Besides this, there is an attitude of comity and courtesy, the violation of which is immoral.

You doubtless already perceive the direction in which this argument is drifting. The most notable ethical offence in institutional relations that is serious is committed in the inconsiderate, almost discourteous, way in which attempts are sometimes made, often successfully, to withdraw men from one staff in order to build up another. My attention has been called to an instance, which fully illustrates this, in which three, and possibly four, members of the staff of a certain institution were approached by the management of another institution at a most critical period of work, without the slightest recognition of the head of the institution thus invaded or even of the heads of departments from which the men were to be drawn. No inquiry was made as to whether the men could be spared without disaster, or at what time they could be withdrawn with the least damage to the work of the institution losing them. The result was that negotiations proceeded at first without any opportunity on the part of the administrative head of the invaded institution, because of his ignorance of the situation, to confer with the men he was likely to lose with the possibility of offsetting the inducements on one side with inducements on the other. Probably this is not an unusual case. It may be that we have all been guilty of sins in this direction, but if we have it is time to repent and deal more righteously with our neighbors.

It is probable that the work of an experiment station is more susceptible to serious damage, through the loss of members of its staff, than is that of the college. In college relations, a member of the faculty will generally finish the work of a term before withdrawing to go to another institution. In experiment station activities, the study of many problems is long continued, and when those in charge of an extended piece of investigation abandon it before its completion, it often means disaster to the work and entails great loss not only of the funds but also of the scientific energy of the institution. Doubtless in the records of the experiment stations here represented, there will be found set up many tablets on which is inscribed the words *hic jacet* as marking the end of a piece of research.

It is not expected that colleges and experiment stations are to adopt a policy of unreasonably interfering with the promotion of members of their staffs, when they are called to other positions. It is reasonable, however, that when one institution wishes to acquire a man from another, there be a mutual conference through the administrative heads of the institutions interested, as to the time at which the transfer shall be made, if made at all, that will most fully conserve the interests of both institutions. We have

certain institutions heavily endowed, paying much larger salaries than the average, but these, because of their abundant funds, have no right to invade the staffs of the institutions in the smaller states, without giving due consideration to their welfare. A trained man, or a new truth proceeding from one of the smaller New England States, may be just as valuable to the Nation as if it was the product of a large and heavily endowed staff.

It would not be wise to establish hard and fast rules in accordance with which transfers of teachers or investigators shall be made, excepting that all negotiations looking to this end shall be open to the understanding of responsible officials. Each case must be considered by itself, otherwise, injustice, in some cases, will result. It will be a serious indictment of the spirit of courtesy and the sense of honor of college presidents and station directors, if, by conference, decisions are reached which do not safeguard to the fullest possible extent the interests of both institutions and individuals.

This brings us to the question of the moral obligation resting between an institution and the individual members of its staff. Those of us who have had the burden of administrative duties for many years have admired the loyalty and spirit of self-sacrifice which have often been exhibited by young men desirous of improving their condition, when they have been asked to accept another position with a larger money recompense. On the other hand, we have noted cases where the welfare of the individual seemed to be considered of more importance than the welfare of the institution. My observation leads me to believe that administrative officers have been conscientiously desirous of not interfering with the individual welfare of the members of their staffs. They have, as a rule, I believe, consented to sacrifice institutional efficiency in order not to invade individual rights. But should we not regard the obligation as mutual? If young men and women are given an opportunity to acquire some reputation, either as teachers or investigators, they should bear in mind that the opportunity has been given them through the support of the people of the Nation and the State, and that they are in duty bound carefully to consider the rights of the institution that has nourished their efforts.

It seems wise that an understanding should be reached along such lines as this. A teacher should complete the work along a certain line with his classes before going elsewhere, and the man engaged in an investigation should not expect to abandon it, unless he would be held an unreasonable length of time, until the work has reached a point where it may be safely transferred to other hands. Why should not such an understanding be made with appointees to staffs when they enter upon their duties? Such a policy would more clearly outline the respective obligations resting upon the institution and the men and would avoid misunderstandings that are sometimes exceedingly unpleasant.

But, after all, while there are conditions that are not ideal and violations of the spirit of loyalty and welfare service are observed, it may be fairly claimed that no body of men and women in this country exhibit a higher standard of devotion to duty and a more loyal spirit of self-sacrifice than do the members of the teaching and investigational staffs of our institutions.

**THE PRESIDENT.** The next number on the program, "The Development of Research in the United States," will be discussed by Dr. James Rowland

Angell of the University of Chicago, Chairman of the National Research Council.

## THE DEVELOPMENT OF RESEARCH IN THE UNITED STATES

By J. R. ANGELL

### I. THE NATIONAL OBLIGATION TO FOSTER RESEARCH

Among the many lessons which the war taught us, few have made a deeper impression upon the public mind than that of the part played by science and technology in the prosecution of any of the great undertakings of modern life, and, for that matter, in the maintenance of the social order itself. That the United States has been backward in these directions was common knowledge to the experts, but was not suspected by the rank and file. In a general way it had long been a subject of comment that the Germans had succeeded in exploiting scientific research for the improvement of their industry and agriculture to a degree unrivalled by other countries. But with the outbreak of the war the crushing efficiency of the many new technical devices of the German army lent added emphasis of the most dramatic character to the appreciation of what had in that country been accomplished in these lines.

When the United States was drawn into the war one of the first problems which presented itself was the securing of the necessary number of scientific experts to organize and direct the tremendous technical enterprises which had promptly to be put on foot. Instantly, it became apparent that not only were we backward in the utilization of scientific methods and intelligence in the solution of our economic, social, agricultural and industrial problems, but also that we had no definite knowledge of where the personnel required to deal with the new scientific issues could be found. In other words, there had never been occasion for any general mobilization of our scientific resources, and we were accordingly obliged to start at the very beginning. One of the first tasks to which the National Research Council set its face was precisely this gathering together of competent men, bringing together the job and the man wherever possible. Most of these men were promptly swallowed up in one or another of the government organizations, chiefly those of the War and Navy Departments. But the lesson taught by this war-time experience will not be soon forgotten, and it is part of the peace-time program of the National Research Council to establish in perpetuity arrangements whereby there will be in some sense a permanent mobilization of the scientific ability of the country, to be directed in times of peace to the social, industrial and governmental necessities of such periods, and to be instantly available in case of a future war for the purposes of national defence.

While the war brought forth the most pressing demand for mere technicians in quantities never before dreamed of, and while the War Department struggled with a high degree of success to produce quickly the necessary number, and the necessary quality in these men, the more important lesson for our permanent interests in times of peace was the extent to which the demand was felt for men capable of carrying on research whether in the way of improving old methods, devices and apparatus, or in the way of devising wholly new methods. At the declaration of the

armistice, practically every scientist possessed of any capacities for research found himself taken up in one way or another into the great national machine where he was called upon to make some contribution to the innumerable problems presented by the war. Nothing can be more certain than that the character and rapidity of our national development in all matters which relate to industry, agriculture, public health and the preservation of the physical framework of our civilization will be dependent upon the quantity and quality of sound research which is carried on. The truth of this assertion becomes even more apparent when one recognizes the fact that every modern nation stands in relations of industrial and commercial competition with other nations; and in the measure in which this is true, to fall notably behind the others in scientific development is to precipitate a trend of events which spells national depression and disaster. In other words, the price of a sound, progressive, national life is in these times widespread and intelligent scientific research.

It is to be recalled in this connection that Great Britain and her dominions, Italy, and Japan, have all set about to solve this problem through government subvention, and France is said to be contemplating a similar move. Now it is to be recognized with full appreciation that in recent years both Federal and State Governments have made substantial contributions for purposes of research, particularly in agriculture, engineering, and the industrial arts. The sum total of such appropriations for 1919-20 I have no means of giving with precision, but so far as I can discover, it runs up to at least \$10,000,000. All this is hopeful and indicative of an open-minded and progressive spirit. Such shortcomings as it exhibits are largely incidental to the administrative conceptions under which such legislation is sometimes carried out. There has perhaps been temptation to put undue emphasis upon immediate practical and local issues, some of them intrinsically trivial, rather than upon the more fundamental and far-reaching forms of inquiry; but it would be very unfair to criticize in any carping spirit a movement dictated by motives of so sound and generous a character, and one whose duration has been so brief as to afford relatively little opportunity for improvement through experience, the only means by which reliable knowledge can be gained. Certainly the national character of the obligation to foster research, both in pure and applied science, as widely as our resources will permit, cannot be called in question by any thoughtful observer of the present trend in the development of civilization, and it is essential in this connection that we conceive of research as the organized technique of science itself for its own propagation. It is, so to speak, the reproductive process of science. To think of it, as is often done, as a mere addendum to science, as a sort of luxury of the scientific idle rich, is fundamentally and perniciously false.

More specifically, this obligation to foster research means, first, the providing for a greatly enlarged personnel with much better fundamental training than is at present available. It means, second, the securing of the necessary facilities of laboratories, apparatus, and all the physical conveniences that are involved in scientific work. It means, third, the procuring of sufficient freedom from other duties to permit research workers to give their full and undivided attention throughout such periods as may be necessary to the completion of their research undertakings.

It may contribute to a just estimate of the problem which confronts us

in this country to survey briefly the conspicuous characteristics of the major agencies available for the conduct of research.\* These I take to be:

- (1) Experiment stations of the Federal and State Governments,
- (2) Federal scientific bureaus,
- (3) Research foundations including museums,
- (4) Industrial laboratories,
- (5) Educational institutions.

We may consider them in this order.

## II. RESEARCH IN EXPERIMENT STATIONS

When the State and Federal Governments first established experiment stations which were, so far as I am aware, chiefly devoted at the outset to agricultural interests, there was great hope that they would become centers of the most far-reaching research. Many of them have indeed accomplished work of the very highest quality, but as time has gone on not a few—if I may trust report—have found themselves increasingly swamped with mere routine detail of a kind which represents, to be sure, a very real public service, but not one which is in any sense directly of a research character. Probably no one will question the desirability of circulating as widely as possible in a potato-raising district any new information regarding the best methods of combating the enterprising potato bug, but it may certainly be questioned whether it is a wise expenditure of the energy of a man competent to carry on fundamental research in entomology to permit his time to be monopolized by individual correspondence with farmers desiring enlightenment on the familiar pests of their own district. In other words, there has come to be some appreciable and unfortunate confusion of purposes, due in part to the very success of the experiment station, whereby its function as an essentially educational institution, disseminating useful knowledge, has come to be confused with its function as a device for investigation and the procurement of new knowledge. The issue is in some sense parallel with that in our universities where there is constantly in progress an active conflict between the obligations of instruction and those of research. The needs of each must be consulted, but neither must be allowed to stifle the other.

Moreover, with the growth of certain of our experiment stations there has arisen a lack of coordination between their several divisions which materially diminishes the value and the possibilities of their scientific output. Nowhere perhaps is the actual opportunity for scientific cooperation more obvious and yet—if again I may trust report—there is too often a practical isolation of the work of one division from that of another, with a resultant loss in the scientific productivity of the plant. Whether these difficulties, where they exist, are wholly remediable by a more thoughtful and effective organization at the head, or whether they are at present indigenous to the theory of the experiment station itself, I do not know. To an outsider, however, it would not seem an insoluble problem to hit upon devices which would assure frequent conference and intimate cooperation on the part of the personnel of the several divisions of such stations. That

\*I am not unmindful of the many scientists, such as state geologists, health officers, etc., working under state auspices, nor of the unattached individual scientists in various parts of the country. But, I have intended to stress here simply the specific institutions in which research is of exclusive or considerable interest.

a station should be administered substantially as a scientific unit, if it is to achieve its maximal scientific productivity, would seem almost axiomatic. It is also reported that the stations conduct their work in too complete isolation from one another, and that profitable opportunities for cooperation are often neglected. If this be true, it should certainly be remedied as promptly as possible.

#### RESEARCH IN GOVERNMENT BUREAUS

The conditions in the scientific bureaus of the Federal Government are said to differ widely from department to department. Taken as a whole, the productivity of these groups has been most creditable, but again, just as in the case of the experiment stations, certain of them have been deluged with the obligations of routine detail connected with the dissemination of knowledge, with a consequent diminishment of their research productivity which has at times been most lamentable. Furthermore, as in the case of the experiment stations, assuming that current report may have some foundation in fact, there has in certain instances been not only absence of satisfactory cooperation as between the subdivisions of a given department, but there has also been a somewhat complete isolation of the bureaus of one department from those of another. I need not pause to describe the peculiar Washington conditions which have led to this regrettable result. I fancy I betray no secret, however, when I say that in general the traditional attitude of the several departments to one another has not been one of active cooperation. One need not be a wholly impractical idealist, nor totally oblivious to the fundamental interests of the departments as such, to regard this situation, so far as it is thus correctly described, as intrinsically unwholesome and probably unnecessary. It must certainly result in preventing to some extent the maximal research productivity of the federal bureaus. It is only fair to say that during the war conditions in this respect were markedly improved, and it may be hoped that with the resumption of peace-time conditions the lessons taught by the war may not be wholly forgotten.

The bureaus rightly enjoy, in some cases, splendid financial resources and an unrivaled prestige in the public confidence. On the other hand, it would be a piece of obstinate disregard of fact to overlook certain limitations under which their research work is carried on. For, once more, as in the case of the experiment stations, the bureaus are apt to be subjected from time to time to irresistible pressure to deal primarily with issues of apparently immediate practical consequence. It is proper and inevitable that a large part of their energy should be thus directed. Public support could hardly be otherwise commanded, and work of this character is urgent and essential. Now, it is well understood that as a byproduct of such practical experimentation, scientific results of the most fundamental character are occasionally achieved. But, in general, it can be predicted with certainty that the great far-reaching contributions, running out in innumerable practical directions and valuable for generations to come, are the results of research in pure science carried on without any regard to immediate practical consequences. I would be furthest from implying that such research is not conducted in government bureaus: I merely remark that the almost inevitable tendency is in the other direction, and that in so far as this is true, the Nation fails to secure the largest possible returns

from its scientific staff. Moreover, there are necessarily thrown about the expenditure of funds for government work certain arbitrary restrictions which arise again and again to hamper the efficiency of the scientific procedure. I will not say that these restrictions are inevitable under the conditions of congressional appropriation of funds, but I am reasonably certain that they are not likely to be wholly eliminated in any immediate future. From this point of view, private agencies, in many fields of work at least, enjoy a decided advantage.

#### RESEARCH FOUNDATIONS

I should include under this heading not only institutions such as the Rockefeller Institute and the Mellon Institute, but also certain of our great museums, which possess funds available from time to time for strictly research work.

These institutions, when effectively manned and intelligently administered, are extremely productive, both in fields of pure and of applied science. They are in a position to bring together groups of carefully selected experts, who can be surrounded with the best of laboratory facilities, and can be given complete freedom from every competing interest. The output of such institutions affords already convincing evidence of scientific achievements of the most valuable kind. There has been some disposition to urge that the great mass of the research work of the country should be carried on in institutes of this character. Despite their undoubted advantages in many directions, they are very costly to administer, and a good bit of their attractiveness and efficiency would be lost if they were compelled to operate under the conditions of state or federal stations, which is the only alternative when private resources fail. It is probably too early to judge with confidence regarding certain of their limitations, but there is some reason to think that there are relatively few men of the research type who work to best advantage in conditions of so considerable isolation as commonly exists in these institutes. The institutes are more or less specialized, and one of the great and impressive lessons which the war has taught us concerns the unexpected relationships which develop out of the pursuit of any of the larger scientific problems. A study which begins as a modest investigation of a zoological problem has presently run out into botany, physics, chemistry, meteorology, and goodness know what else. There are some advantages, therefore, for the fundamental research man, if he may find himself in a community containing a wide variety of scientific interests.

#### RESEARCH IN INDUSTRIAL LABORATORIES

This group is for the most part concerned in the very nature of the case with immediate practical issues, although some of the larger industries, particularly those dealing with electrical problems, have already discovered the potential value of research in pure science.

There is substantially no limit to the extent to which research in these organizations can be carried, for it is almost wholly a matter of organization and selection of a trained personnel. American industry has, as compared with German industry at least, and even with some portion of British industry, been astonishingly backward. As will be indicated at a later

point, the National Research Council is making the development of research in the industries one of its principal fields of activity. Perhaps the most serious limitation in the administration of these research laboratories at present, apart from their dominant concern for immediate practical issues, is the extent to which in some organizations the individual scientist is kept out of contact with the work of his fellows in their attack upon difficulties of industrial or manufacturing procedure. Such isolation is at times demanded in the supposed interest of preserving trade secrets; at times it is a mere byproduct of the form in which the research work is organized. In either case, it tends to detract somewhat both from the interest and the dignity of the occupation, and, at least in the long run, to detract also from the rapidity of scientific advance. The attitude of mind generated in a scientist working in a laboratory of this type is necessarily somewhat hostile to that which has now become traditional in other fields of research. The obligation to give publicity to new discoveries in science is everywhere else held to be mandatory. Here the obligation is of a precisely opposite character, and the scientist is brought face to face with the antithesis between the supposed financial interests of his employer and the interests of his competitors and of the general public.

#### RESEARCH IN EDUCATIONAL INSTITUTIONS

The colleges, technical schools, and universities of the country sustain a double relation to the research enterprises of the Nation. On the one hand, in these institutions, and particularly the last named, there has been conducted throughout the last generation far the larger part of the research in pure science, with a very considerable representation of research in applied science in technical institutions and the professional departments of the universities. On the other hand, these institutions are at present the sole source from which is derived the trained personnel from which the remaining research agencies are recruited. In dealing with the problem of research in such institutions, this double function must be kept constantly in mind. Not only are we under obligation to safeguard and improve the conditions of research itself, but also, and in perhaps greater measure, to look to the conditions under which the highest class of research men can be produced. Both quantity and quality must be improved.

It is a matter of common knowledge that the most serious limitation of the research productivity of these institutions is occasioned by the overwhelming burden of classroom instruction which many of the men are obliged to carry. Such classroom work is not only destructive to research because of the sheer intellectual and physical fatigue which it occasions, but also, and perhaps more significantly, because of the interruption to attention and the close observation of critical phenomena which it compels. In some fortunate institutions provision has been made for considerable periods of uninterrupted research work, and again, in certain other institutions men can so arrange their teaching duties as to secure freedom in certain portions of each week. But, in general, university research is carried on in the interstices of other duties, and the only wonder is that so much of it is produced, and that on the whole it is of so respectable a character.

Again, many institutions in this group are seriously limited in the physical facilities which they are able to put at the disposal of their men. Much admirable research has thus been crippled at the very outset.



In the training of personnel the same difficulties recur, with the added difficulty, now much aggravated by the prodigious increase in the cost of life, that the research career is even less attractive than in the immediate past. The Nation must be aroused to a full appreciation of all that this implies in the decadence of our position in the scientific and industrial world. So far from being in a position successfully to survive a decrease in this personnel, we need a very great increase in the number and a great advance in the quality of the men entering upon this career. The answer is obvious, even simple i. e., salaries for research men must be very materially increased, the conditions of work must be made intrinsically far more attractive and, if possible, there must be secured a larger and more intelligent public appreciation of the social contribution made by the successful investigator.

One serious shortcoming of the research functions of educational institutions as at present administered is the substantially complete lack of any rational program for dividing among themselves the field of research. Many institutions have as a consequence of this fact been tempted into the effort to develop research in many lines of work which they ought never to have undertaken. State institutions in particular are often exposed to pressure, which they find it difficult to resist, to set up new departments, many of them implying research as part of their work, where such departments are in no educational sense at all justified. There must certainly be a careful study of this situation with at least informal cooperation among the universities, if we are in any degree to reap the largest harvest from our research possibilities. To multiply indefinitely the same type of research work in an unlimited number of institutions condemns us at once to a most wasteful expenditure, both for material and personnel, with no possible corresponding advantage.

This sketch of the research facilities of the country makes no pretense of being exhaustive, but it may at least serve to indicate the major groups of agencies and something of the peculiar circumstances under which research is conducted in each of them. My purpose has been to suggest the very varied conditions which exist in order to make clear that any fundamental program directed to the improvement of our national efficiency in all this matter must take constant account of the complexity of the problem and provide for such methods as the exigencies of each group may require.

### III. ORGANIZATION AND COOPERATION IN RESEARCH\*

It is a not infrequent remark, and one which I believe to be measurably just, that science despite its magnification of method has never seriously worked out the method of its own organization. For the most part, it has thus far rested on individual initiative and on such loose forms of cooperation as are based upon the magnetic or coercive personality of some one scientific man. Assuredly, nobody expects to achieve a system of scientific progress which will in any sense be independent of the presence of commanding intellects; but it is equally certain that scientific men have as yet only achieved the most elementary beginnings of the organization of scientific interests. Indeed, it has been something of a fetish among scientists that we must rely upon individual inspiration and initiative, and that the

\*The subjects discussed in the remaining sections of this paper were touched upon in similar form in an address before the Association of American Universities at the meeting held November 7, 1919, at Columbus, Ohio.

individual worker must be safeguarded in every possible way from the corroding influence of administrative organization. It has unfortunately been generally assumed that an organization which interests itself in research will inevitably exercise such a depressive influence on the research worker. This I believe to be essentially untrue in theory, and I am at the moment connected with an organization which is directing all its energies to proving it untrue in fact. No doubt there will always be wide ranges of scientific work where the individual must toil more or less alone, but on the other hand, no one who has thoughtfully contemplated the conditions under which modern science does its work can have failed to be impressed with the innumerable unimproved opportunities for cooperation.

In the first place, we have, through processes which I need not stop to describe, parceled out the field of knowledge to a great group of sciences each of which is, perhaps not unnaturally, disposed to claim supreme jurisdiction over its own bit of territory. The world of science has thus come to present somewhat the appearance of an English landscape with its checker-board effect of small fields set off from one another by high, impenetrable hedges. To one who toils inside such a field, the universe is limited by his own hedge-row, and inside it he desires to be left in peace to cultivate his crop as best may suit him. The parable has of course its element of exaggeration, but it is unfortunately not so much exaggerated as one might wish, and there are not a few scientists whose thought and speech would seem to indicate an amazing lack of appreciation of the intellectual content of their own work.

The actual fact, of course, is that the dividing lines of science are, like the hedge-row, in large measure arbitrary and practical, and consequently subject to persistent modification. Practically speaking, chemistry and physics are profitably conducted as separate sciences, and yet they overlap and impinge upon one another in ways which have already created the border science of physical chemistry. Botany and zoology have similar relationships. Chemistry and physiology are neighbors of the most intimate kind. Psychology and neurology can hardly get along the one without the other. And so it goes. Now under the present organization of science—or lack of it—there is no localized responsibility for bringing together in co-operative enterprises research workers occupying fields that are thus convergent or overlapping. There is genuine need for such cooperative work in many different directions and one of the first obligations of any method adopted to further the general interests of scientific research must be the providing for investigations which shall thus bring together the scientists now occupying neighboring but distinct fields.

Obviously organization in research must involve something substantially different from organization in enterprises of other kinds, for example, war, industry, sport, and exploration. Organization, I take it, looks primarily to the efficient mustering of all the resources available for a given undertaking, and as the ends desired vary, so do the means for their attainment. In war, the individuality of the private soldier must be in large measure subordinated to the conception of the high command, and while any ideas he may have to offer may theoretically be received, in practice his initiative is reduced close to the zero point through the larger part of his service. Obedience, rather than initiative, is the first military virtue. Similarly in industry, ideas are desired and generally encouraged, but nevertheless in

the stress of the day's work, each individual workman must play his previously assigned part, play it promptly and without debate, become in short a cog in the great machine; otherwise production is blocked and economic disaster may be the result. Initiative and ingenuity are essential at the top of the organization. Moreover, ideas supplied from workers at any level of the process are in progressive industries welcome, but the actual application of them to the procedure in hand must ordinarily come from above and the individual unit in the machine must function more or less mechanically.

Evidently organization in research calls for quite a different distribution of effort. Individual initiative, resourcefulness, ingenuity, imagination, vision, must be kept at a high pitch all along the line. Here we are not concerned with quantity production of a stereotyped product, of which the hundred-thousandth specimen shall exactly resemble the first. On the contrary, the product is in some sense constantly varied and unless it prove to be varied, the process has failed of its purpose, has degenerated into mere hack work, or has been based on essentially mistaken principles. On the other hand, the conception not infrequently entertained that the research man is necessarily the genius working in seclusion is essentially untrue to most of the facts. Many a genius works in seclusion and all research men must be free to work undisturbed at the task in hand; but there are many forms of scientific problems whose solution is essential to the modern world, which are so complex that no one scientist is equipped to deal with them single-handed. Either they must wait for their solution upon the accidental arousal of interest in the appropriate group, or there must be some definite purposeful cooperation established. The great fundamental discoveries may perhaps, as a rule, await the wholly spontaneous efforts of the great genius, but many discoveries of the utmost value to humanity have come from the somewhat accidental observations of men of essentially moderate talents. And not only so, but a very large fraction of the progress in our scientific knowledge in the last 50 years has come not from the work of the occasional genius, but from the hard, persistent, thoughtful investigations of men who would never be classed as geniuses in any ordinary sense, but rather as trained men of large native ability. This group of men are more often than not, eager for those forms of contact with other scientific workers which shall enlarge their own outlook upon the problems with which they are engaged and which shall enable them to pursue more effectively their individual researches. For such men betterment of the machinery of scientific cooperation and the dissemination of useful scientific information involves not only no invasion of their individual initiative, but often is the condition of its successful expression.

To put it in slightly different form, and at the risk of repetition, one may say that a fairly prevalent conception of research associates it with the somewhat mystical intellectual operations of the genius, or "near-genius," to tamper with which is a kind of profanation. In this view one must simply wait upon the deliverances of fate. To attempt to assist by any devices of organization is futile. As a matter of fact, large areas of the most needed research lie in territory where properly trained men of talent, given proper conditions of work, may produce constantly and in increasing measure results of the utmost consequence. But one of the conditions of maximal efficiency is that they shall work inside the framework of a gen-

eral program in which there is intelligent cooperation in the allocation of the field and in the constant communication of results achieved. Such distribution of responsibility and effort is entirely consonant with the fullest actual initiative which any scientist can desire. No one compels him to investigate where he does not desire so to do, but by a centralized device for planning, he can make his effort count for far more than when he works wholly alone. This is as true of the zones of pure science as it is of the regions of applied science where organization is often thought of as less foreign to the ends sought. Indeed in the research laboratories of a few of the great industries such cooperation has produced the most remarkable results.

Even if organization in research meant no more than thoughtful discussion and planning among a group of men engaged in the same lines of work, it would be immensely worth while. For example, here are a dozen forestry experts in position to determine the research problems which shall be first attacked by the staffs of a dozen different organizations. If there be no contact among them, they may all decide to start upon exactly the same problem, or upon utterly disconnected problems. Undoubtedly, some excellent results may emerge under such conditions. And yet nothing is more certain than that the energies of the entire company could have been invested to far better purpose with much less of wasted effort had there been intelligent planning before work began. There is abundant practical experience to justify this conclusion. Repeatedly it has occurred that men working in entire ignorance of what others in their field were doing have traversed the same ground and with results which in no wise justified the wasted effort.

But as a matter of fact, organization in research means much more than this. Many highly important projects, as we have observed before, involve for their execution the converging efforts of men in different fields of science, and in applied science in particular. The agencies interested in improvement of methods must at times come together to set in motion the necessary research work, or it will not get done. Furthermore, the technique for the prompt and convenient dissemination of information regarding discoveries in research is at present lamentably imperfect, and we shall never capitalize our scientific energies at anything like their full value until this condition is removed.

Cooperation in research may be profitably developed, first, as between scientists working upon related problems in the same general field—say physics; second, as between scientists in different but adjacent fields—e. g., chemistry and biology; third, as between scientists in different countries, where such cooperation is often essential to success; fourth, as between agencies like the industries requiring the benefits of research; fifth, as between organizations, e. g., government bureaus, experiment stations, and universities; and sixth, by improvements in methods of rendering easily accessible information regarding scientific discoveries.

As practical illustrations of the type of thing we have in mind may be mentioned certain of the problems of public health; for example, sewage disposal presents a question in which the organic chemist, the colloid chemist, and the sanitary engineer are all necessarily involved. The National Research Council has secured the services of a very representative committee to study the fundamental problems of food and nutrition, a prob-

lem which in this same way represents the combined interests of a considerable group of sciences. The successful solution of the problem cannot be reached without the cooperation of men representing these distinct but related fields of science. One of the most promising ranges of contemporary research is in that borderline group of problems in which the biologist, the chemist, and the medical scientist find their interests converging. A physiological chemist, however learned he may be, is compelled to turn from time to time for scientific assistance to one or other specialist in this group of neighboring sciences. Indeed, it is practically impossible to pitch upon any problem in modern life whose complete solution does not involve an appeal to several lines of scientific approach. In certain cases, through more or less happy accident, the required scientific cooperation is easily secured, but in many instances there has been no adequate provision for securing such combined attack.

Again, within the field of any one of the great sciences, there is opportunity for a kind of cooperation in research which has never been undertaken on any large scale and which can, if properly stimulated and guided, produce results of the highest consequence. For example, there is at the present moment being considered by the National Research Council a nation-wide investigation of the problem of reforestation such as no extant single agency can hopefully attack. Similarly, it is hoped to study the problems of soil fertilizers in different regions of the country by means of cooperative effort in a considerable group of appropriate agencies.

In certain ranges of science there is not only necessity for the cooperation of individual scientists, working on different aspects of the same central problem, but here is also need for international cooperation. One only needs to cite such problems as those of astronomy, seismology, meteorology, and terrestrial magnetism to appreciate how essential simultaneous observations at various points of the earth's surface may be. In such cases, international cooperation is absolutely indispensable. Nor are the forms of profitable international scientific cooperation in research confined to the spheres of astronomy and the major phenomena of the behavior of the earth's surface. The study of the behavior of plants and animals under certain standard conditions will afford numerous instances in point.

Perhaps the most obvious illustrations of the possibilities of successful cooperative investigation are represented in certain forms of industrial research where a group of producers come together and establish a research organization, either establishing laboratories of their own for this purpose, or utilizing extant laboratories through which they can arrange for the admittance of their investigators. It is of course well understood that certain of the great manufacturing industries, particularly those connected with the development of electricity, have developed laboratories of the most elaborate kind and of a very high degree of efficiency. But the smaller concern cannot afford to develop its own scientific staff, and consequently the cooperative device is found to be the best substitute. This process, which has been carried to a considerable development in Great Britain, is being rapidly fostered in this country and gives promise of extremely valuable results. Several different methods of procedure are feasible, but time will not permit further discussion of the matter here.

Finally, one may mention the types of cooperation in research which may be achieved by the establishment of more intimate contact between

the organizations and institutions now actually engaged in such work. As has been already indicated, we have at present, as the main features of our national research equipment, certain of the scientific bureaus of the Federal Government and the several States, certain large research foundations, including a few of the great museums, a group of research enterprises in the industries, and the research work done in our universities. In each of these, individuals are at work on problems which, so far as is known to the men engaged upon them, are at the moment not under attack elsewhere. But our present organization is totally devoid of any adequate means for securing information as to the research work at a given time in progress. In consequence, it repeatedly happens that men are found to have been working on common problems, investing time and energy which might have been expended to far better effect could they have been brought in touch with one another and have learned each what the other had to give in the way of knowledge already ascertained. In the case of the industrial laboratory, both the economics and the ethics of the case render it improper that information should be disseminated as to what is being learned. Even scientific men working alone as individuals have oftentimes been extremely jealous of their prerogatives in the matter of priority of scientific discovery, and have treated their work somewhat in the spirit of the trade secret of the industries. But over against this relatively small group there has always been a larger and more open-minded body of scientists eager to learn whatever could be brought to bear upon their own researches, and willing and ready to communicate to others whatever they had to offer of worth. Generally speaking, the ethics of scientific research outside the industrial laboratory is rapidly coming to a point which commends and demands publicity. Indeed, it may be said that this condition has already substantially arrived. Men are eager for more prompt and adequate means of publication of scientific work, and one of the crying defects in the scientific situation as a whole, one which is far more serious in some branches of science than in others, is the need, first, for a central clearing house of information regarding current research work and its status from month to month and year to year; and second, far more complete and more effective modes of publication of scientific results. Publication needs to be more prompt, and needs to be accompanied by much more adequate methods of abstracting and indexing than at present are in operation. To these problems, also, the National Research Council, through its Division of Research Information, is turning its hand, and we hope to be able not only to point the way to better conditions, but also to make a substantial beginning in the actual improvement of these conditions. I will not pause to discuss the entire program of this service, but I may simply say in passing that it contemplates catalogues of research laboratories, of current investigations, sources of information, laboratory facilities, catalogues of scientific and technical societies with indices of foreign reports, and a somewhat detailed program for the improvement of scientific publications, with particular regard to systems of abstracting and indexing.

#### IV. ORGANIZATION OF NATIONAL RESEARCH COUNCIL

To assist in meeting some of the needs of scientific organization in the United States, the National Research Council has been organized. It attempts to achieve in a democracy, and by democratic methods, such a

mobilization of the scientific resources of the country as shall permit their most effective use not only in times of crisis such as war, but also continuously in times of peace. The German Government had succeeded under autocratic methods in carrying such organization to a high degree of perfection and had procured the most striking results not only in the military administration, but also throughout the entire field of industry. Whether we shall be equally successful under the voluntary extra-governmental plan which we are developing remains to be seen. It may, however, be said at the outset that, rightly or wrongly, the opinion of scientific men is substantially unanimous that in our country an enterprise of this character can only reach its highest possibilities when freed from the restraint of government control. This, however, should in no wise be understood as reflecting upon the efficiency of the scientific work carried on by the various departments of the Government. It does, however, argue a widespread conviction based on experience that these departments, despite their many great advantages, must of necessity work under limitations of a very definite and often unfortunate kind.

As the first step in securing a democratic foundation, the National Research Council is based upon the election of members by the great scientific societies of the Nation, some 40 being represented in the present roster with a constituent personnel running up into the thousands. These representatives from the scientific societies are organized in divisions, of which there are seven representing science and technology. Each such division elects a chairman, who becomes a salaried officer of the Council, resident in Washington for one year, and in charge, together with an executive committee of his division, of the scientific work to which the division decides to set its hand. Provision is made for a certain number of members of each division to be selected at large, thereby insuring as far as possible the presence of a thoroughly representative scientific group, for it may at times happen that some important scientific interest is by accident omitted in the elections from the societies.

The Council has also six so-called general divisions whose officials are appointed by the executive board of the Council, and who conduct the work of the divisions much as in the case of the science and technology group. The personnel of these divisions is determined by the executive board, with the exception of a few persons who are *ex officio* members. These divisions cover the Federal Government, foreign relations, the states relations, education, industrial relations, and research information.

The government division has upon it representatives of each of the scientific bureaus of the Government, and is intended to foster, so far as possible, cooperation among such bureaus and among the outside scientific agencies working on similar problems.

The foreign relations division has to do with foreign scientific societies. An International Research Council was established at Brussels during the past summer, and will take the place of the old international associations and unions which, in forms somewhat modified by the war, will comprise the international unions organized under the International Research Council.

The states relations division concerns itself with the attempt to foster helpful cooperative relations among the scientific bureaus and other scientific organizations of the several States. There appears to be opportunity here for an outside disinterested agency to render very great assistance.

The educational division has to do with the interests of research in educational institutions in all its aspects. This division is beginning its work by a careful study of the actual facilities for research in our American educational institutions. It is hoped that by bringing together reliable information about these conditions it may be possible to formulate a more effective program for the utilization of such resources as we now enjoy, for the improvement of the same and for the development of a larger number of better trained research men. Any rational adjustment of the program of research development in our universities, such as was referred to earlier in this paper, involves a careful preliminary scrutiny of the extant situation. There are some types of research work whose development can be justified only at a limited number of institutions. To have a great group of universities each attempting to do such work is wasteful of personnel and material resources alike. We shall hardly, however, be able to move on to a saner distribution of scientific effort until we know more precisely what are the actual facts in the case, much less can we educate public opinion to accept a reasonable distribution of responsibility.

The industrial research division has as its work the stimulation of research in the industries. It seeks particularly to bring into contact industrial groups, interested in improving their scientific technique with scientific men and agencies competent to render the necessary assistance.

The research information service involves a program in many ways the most unique which the Council has to offer, in its attempt to create mechanisms for giving prompt and accurate information regarding not only the finished products of research of all kinds and in all parts of the world, but also the conditions in current research. Its general intentions have already been briefly described and need not be repeated.

Taken in its entirety the work of the Council is to be understood as primarily one of stimulation of research in both pure and applied science, and in the creation of an enlarged and better trained research personnel, with particular emphasis upon the securing of cooperation wherever this can be profitably accomplished—cooperation as described above among scientists in the same field working on different aspects of a common problem, cooperation among scientists in different fields, whether at home or abroad, studying a group of related problems, cooperation among research organizations, and, finally, cooperation among agencies which require the services of research men and research organizations.

The Council is itself frankly a piece of research, a great experiment, whose outcome we await with undisguised interest. Its purposes are worthy beyond question. If its methods be unsound, better ones must and will be devised. Meantime it invites your sympathetic support and offers you whatever service it can render.

**THE PRESIDENT.** The discussion of this important topic will be opened by Dean R. W. Thatcher of the University of Minnesota.

**R. W. THATCHER.** I am interested in the statements made by both Dr. Jordan and Dr. Angell to the effect that there is great need for the development of personnel with a view of promoting research. The subsidizing of prospective research workers is an important matter and likewise the responsibility of those subsidized. There are plenty of good arguments in favor of subsidizing young men through scholarships, fellowships, etc.,



in order that they may prepare themselves for research work; but sometimes such young men consider themselves objects of charity, sometimes, on the contrary, they are more mindful of their own assumed rights than of those of the institution that deals with them. Perhaps we carry philanthropy too far; sometimes it is better to allow young men to prepare themselves for research work at their own proper expense.

Dr. Angell has presented a critical review of the agencies for the promotion of research work and the development of personnel. I have planned to discuss the means by which additional public support for research, particularly agricultural research, can be secured. I am not sure whether this covers a phase of the problem which the Executive Committee had in mind when they selected this topic for discussion at this meeting. I suppose that the question of possible resuscitation of research might be supposed to mean that research is in a dying or comatose condition. I have not felt that such was the case. It has seemed to me that the experiences of the war have led to a new appreciation of the value of research work and that there never was a time when there was so insistent and so consistent a demand for thorough research as at the present time. I suppose it is fair then to raise the question, whether this war-time public interest in and appreciation of the value of research has waned or whether this question is merely one of how to capitalize the present interest in this work into a policy which shall work out in permanent good. I suspect that there is the fear at least that public interest is or will be waning and that public support is going to be hard to obtain. For that reason, I have chosen to discuss this phase of the problem and assume that a brief discussion of certain fundamental facts in the present situation as it appears to me will not be out of order.

As I see it, there are three distinct types of forces which have exerted in the past and are exerting at present pronounced influence in stimulating interest in and providing funds for the support of research. These are, respectively, industrial or economic necessity, personal or corporate philanthropy and educational policy. As specific effects of these three types of influence, I may mention, first, the research which is being carried on in connection with the regular work of manufacturing enterprises, factories, smelters, etc.; second, that which is supported and endowed by corporations like the Rockefeller Institute, etc.; and third, the publicly supported research work which is a part of every important educational institution of high standards and standing, and of various state and governmental institutions which help to establish the educational system of the country.

The character of the research work which is undertaken, as well as its general effect upon the public mind and public good, are significantly affected by the purpose for which it is established.

The first type is characterized by having a specific end or object in view, seeking to establish facts of technical importance and with probable definite and profitable application in industrial processes. Its results are generally protected by patents insuring use only by the private agency which supports the investigation. The public learns of its results only indirectly and has no direct interest in the facts which are demonstrated or in the methods used in researches.

The second type is an outgrowth of the experience by industrial agen-

cies of the benefits of technical research, and is an attempt to provide similar skilled investigations of subjects of broad public interest, using funds which have accrued from the results of the application of scientific methods, business acumen, or exploitation of the natural resources of the country, for the establishment of facts of public, economic or humanitarian interest. The results of these investigations are open to public use, but up to the present, at least, this work is looked upon by a large proportion of our people as having back of it some secret or sinister motive, or else as an attempt to win support to corporation interests by activity in a field of public service which is too technical in character for the public mind to grasp. I am not belittling this work or criticizing the motives of these great endowments for scientific research, but am attempting to present what seems to me to be the public reaction toward them.

The third type of research work has always been a part of the activity of educational institutions. Everyone recognizes the necessity for constantly enlarging the borders of the field of human knowledge. Teaching without research soon becomes hide-bound, uninteresting, of little inspirational or cultural value. But the atmosphere of the university, in the past at least, has tended to limit the field of research to those problems which were academic rather than technical in importance. "Truth for truth's sake" is a familiar slogan. Undoubtedly this is an inspiring motive for research men, but it has not appealed to the public imagination. Hence, public support for this work has sometimes been hard to get, because of the idea, false though it may be, that the work is "impractical," "theoretical," or "visionary" in character. Please understand that I am not defending this point of view. No one has keener respect for the methods and results of this type of research than I. Furthermore, much of the very best and most fundamental research in science can be shown to have direct economic value in industry or agriculture. But the results of this type of research, while freely available to the public, seem to be regarded as of little use to it. I believe that it is a correct interpretation of the general public reaction toward it to say that its purpose, methods, and results are little understood, and there is little enthusiastic support for it. The work of the agricultural experiment stations is somewhat better known and enjoys a somewhat more desirable position in the public mind than does general university research; but even here it is evident that station men feel that they do not have all the public support to which the importance and value of their work should entitle them.

As a result of these conditions, I had come to the conclusion, prior to the outbreak of the World War, that support for research work was tending toward concentration in the hands of private enterprises, with private and personal control of both the methods and the results of the investigations. This seemed to me to be extremely unfortunate. I felt that the general public good demanded that the very best that educated scientific skill could contribute to the solution of the problems of public business, of public health, of public food supplies, and of public social and moral development, ought to be freely available to the use of all rather than confined by patents or other means of maintaining secrecy to the individual profit of a single corporation or industry.

Then the war came on, with its insistent demand for new methods of meeting every conceivable type of constructive and destructive processes. It

seemed that success in the war was to go to that nation which could outwit the other in the production of new engines of war, new uses of poisonous gases, new sources of supply of foodstuffs and munitions of war, etc., It became almost a trite saying that the war is teaching the world the value of research work.

Now the war is over. We are faced with the problem of securing more public interest in and support for research work, the results of which shall be available for the general public good. I suppose that there was in the minds of the committee which suggested this topic for discussion, the idea that during the war active work on agricultural research has been interrupted by the necessities of the war, and that it is of importance now to restore it to prewar activity. I have not felt this as a critical condition. It has seemed to me that the increased appreciation of the practical value of research work of all kinds, including agricultural research, has more than counterbalanced the disrupting influence of the absence of our men in war time service. Further, many of our men have come back with increased respect for research work as a result of their participation in the work of the sanitary corps, the hospital corps, the engineering corps, etc. and their insight into the work of the research organizations in this country and abroad. Therefore, I believe that the present problem is not so much one of getting new interest in research as a life work or better institutional conception of the values of research to the institution as it is that of arousing general public interest in and support of this kind of work.

I believe that the first step is to encourage those who are influential in forming public opinion through addresses, papers, etc., to present this matter in its true light wherever the opportunity is offered. In so far as it concerns agricultural research, this duty will fall on those of us who represent the land-grant college movement, as a whole.

In this campaign, I think that the first fact to be emphasized is that research is not teaching. Agricultural experiment stations have usually been located at or in connection with agricultural colleges. This has given rise to the idea that the experimental plots, feeding stalls, laboratories, etc., are intended to teach or to demonstrate certain established facts and much of the criticism which has been directed toward experiment station work has been due to this misconception. Next, I think that the necessity for and value of exact measurement of all of the contributing factors in an experimental investigation should be explained as ample reason for the expense of such operations as compared with that of similar operations in established enterprises. Such careful work distinguishes real investigation from the haphazard trials or experiments which constitute a part of many ordinary farm operations. Then we must point out that skilled scientists (not necessarily trained farmers) must be used in these investigations; and that agricultural operations like industrial operations are founded on true scientific principles, and that only those who are trained to recognize and understand these principles can accurately interpret the observations which are made in the field or laboratory and draw the correct conclusions therefrom. We must not fail to emphasize the fact that as soon as an experimental study has been brought to a definite conclusion its practical application to agricultural operations will be demonstrated through the extension agencies provided for that purpose. However, it is a sad mistake so to emphasize the practical or economic importance of agricultural research work that our

constituency gets the idea that only men of practical farm experience should be used in agricultural investigational work.

I feel that I would not be completing this discussion of the steps which I think lead toward the securing of public approval and support for agricultural research work, if I did not allude here to the phase of the matter which I have already discussed at a meeting of the section on experiment station work, namely, the necessity for the presentation to the general public of such a united front and such a spirit of cooperation and sympathy between research workers as will lead to more general public confidence in the accuracy and the impartiality of station research work. Dr. Angell has emphasized the need for cooperation between research agencies. I feel that this point can not be overemphasized. As a result, in part at least, of the habit of public criticism of each other's work, which may be a perfectly proper and legitimate incentive to scientific accuracy, the general public has become accustomed to belittling the opinions and the work of so-called "experts." It has become skeptical of the possibility of securing disinterested, impartial and accurate scientific evidence on any question of public concern. On these accounts we need to do everything within our power to re-establish public confidence in expert opinion and to emphasize the true reason for our work, namely, the contribution to the public welfare of an accurate, impartial and thoroughly scientific basis for educational, industrial and agricultural development.

Finally, I should say that the missionary in this movement for better understanding of agricultural research work should be full of a message of good cheer. Pessimism and discouragement never are efficient aids to any movement. Fortunately, there is nothing in the present situation which ought to create this discouraged feeling in the minds of our station men.

Out of the chaos of conflicting political opinion and of rising class prejudice, our efforts to extend the borders of human knowledge, to enlarge the safe and sure foundation for agricultural development, to sift the wheat of true knowledge of nature's laws out of the mass of chaff of superstitious beliefs and misinterpreted results of individual farm experiences, stand clear of suspicion of class interest or improper motives. We may take tremendous satisfaction in the thought that we are dealing with permanent verities rather than with passing vagaries and impulses. Being optimistic and courageous ourselves, we may approach the task of securing public confidence in and support for our agricultural research work with every assurance of success.

**THE PRESIDENT.** May we hear from President A. F. Woods of the Maryland State College?

**A. F. WOODS.** It is really quite unnecessary for me to continue this discussion. I was put on the program as alternate in case Dean Thatcher was not here. Certainly there is no disagreement among the stations and colleges on the questions laid before us. We all understand the purposes of the National Research Council. We realize that the Council is doing everything in its power to promote research and to develop a public sentiment that will support it. I do not believe that we shall find serious difficulty in maintaining our national and state supported research agencies. The support of the National Research Council will undoubtedly be available in maintaining this interest in publicly supported research. I am glad to

note the interest of this Association in cooperating with the National Research Council. In my opinion, the organization of the Research Council is one of the great forward steps in the development of a national policy looking toward the coordination of fundamental research.

**THE PRESIDENT.** President K. L. Butterfield of the Massachusetts Agricultural College will now tell us something of his work in connection with the American Expeditionary Forces and the educational overseas work.

#### AMERICAN EDUCATION OVERSEAS

BY K. L. BUTTERFIELD

About the middle of last February, the Overseas Educational Commission, then quartered in Paris, received orders from Army General Headquarters to proceed to Beaune, a little city in the eastern part of France, to consult with a certain Colonel Reeves, relative to the establishment of an educational center or university for American soldiers. When the Commission got to Beaune, we found that an American hospital about a mile out of the city had been selected as a site for the university. We also found that Colonel Reeves, who had been made president of the proposed university, had been commandant both at Purdue University and at the University of Vermont, and had also been president of Norwich University in Vermont. He was in hearty sympathy with educational work and had definite ideas as to how this new and rather startling undertaking might be organized and carried on. A trifle over a month after this first visit of the Commission, the American Expeditionary Forces University was practically stripped for action. Before the first of April there were over 6,000 students registered in 240 courses, and about 400 classes in operation.

I have opened this discussion by reciting this particular achievement in the educational work of the A. E. F., simply because the establishment and conduct of the University were the dramatic and outstanding aspects of the work of what later became the A. E. F. Educational Corps Commission. To the French I imagine that the University was considered a characteristic American achievement. I suppose, too, that the University stood out in the mind of the Army as a notable affair because it became the headquarters of all the educational work in the A. E. F. And it was, indeed, a rather remarkable effort, not merely because it was so quickly accomplished but in itself. The catalog of the University indicates a strong list of courses and the register, containing the names of all the staff and of the student body, indicates 11 colleges with enrollment as follows:

Agriculture, 676; arts, 282; business, 1,815; education, 77; engineering, 616; journalism, 138; law, 159; letters, 956; medical sciences, 144; music, 182; and science, 640.

In addition to this enrollment, there was a school of art just out of Paris, a farm school at another hospital a dozen miles from Beaune, demonstration division and post schools at the University itself, together with a short term school for teachers who came in from various parts of the Army for this normal training—nearly 500 of them. The grand total enrollment of the University was in round numbers, 9,600. Students were allowed to join their units on the way home, so that when the term was over prob-

ably not more than one-half of the number stated were actually in residence.

The administrative side of building this University excited my admiration. The hospital had formerly had beds for 12,000 to 15,000 patients. The buildings were partly of a permanent construction, of cement and brick, but a very large proportion were frame barracks. Repairs were made on over 200 buildings and something like 175 new wooden barracks were erected. The roads were made over and a system of landscape architecture was carried out. At one time there were in the office of the president, actual projects, large and small, aggregating over 5,000 in number. The development of this work was really a thrilling sort of thing and perhaps characteristically American.

But the American Expeditionary Forces University was only a part of the educational work overseas, serving as a crown to the enterprise and also the center from which radiated a great deal of other service.

For example, another major enterprise was the result of an early plan, namely, placing in the French universities and technical schools large numbers of American soldier students. There were a good many difficulties to be surmounted. Nobody knew when the war would close nor how long it would be before the soldiers could go back. The universities did not themselves know how many students they could accommodate because they could not tell how many of their own students would return at once. Questions of the courses of study adapted to American students and of sufficient instructors were real problems. The finest possible spirit was shown by the French at every point, and, finally, the first of April found about 8,000 American soldier students in the French universities. Perhaps one-fourth of these were in Paris, the rest being scattered about in nearly a dozen provincial French institutions. In addition to this, there were about 2,000 sent over to British universities. More would have gone across the channel but for the fact that at that time the general demobilization conditions and the food supply in England, made it very difficult to consummate arrangements. This placing of American soldiers in French and British universities was one of the most significant parts of our work. I believe it will lead to very important educational relationships later on.

Both of the enterprises mentioned had to do with education of collegiate grade. A strong effort was made, however, to reach all types of men no matter what their educational preparation had been. A part of this plan consisted of division schools; that is, schools based on the army division. It was provided that in any division not to exceed 15 percent of the enlisted personnel could be sent to some center where would be established a school with instruction in a wide range of subjects, but roughly speaking perhaps of high school grade, although there was no such sharp differentiation of quality of work as we would have in our American school system. In the division schools, however, courses were offered in history, English, mathematics, modern languages, as well as in various vocational lines such as agriculture and the trades. Not every division developed this school, largely because divisions began to move coastward soon after the educational work was established. A notable exception was in the various divisions and corps of the Third Army, that is, the Army of Occupation. Under the leadership of President Guy Potter Benton, of the University of Vermont, with headquarters at Coblenz, a very complete and

effective system of division and corps school was established in the Army of Occupation.

The Commission also established schools that were called post schools. In all eastern France and in the Army of Occupation, the fighting divisions were quartered in villages rather than in barracks or organized camps. Some divisions had as many as 40 or 50 different billets, perhaps even more. In each billet there would be from 200 or 300 to 2,000 or 3,000 troops. Of course, with men living in these little villages where they were extremely crowded, with no large rooms for schoolrooms, with inadequate light for study and with many military duties required, the work of education was difficult. Nevertheless, a great many post schools were established which were referred to rather roughly as our grammar schools. As a matter of fact, however, many of these post schools developed good work in the ordinary school branches and even occasionally in vocational lines. It was probably here that the best work was done with the illiterates.

Another phase of the educational work was the extension service. There is no doubt that the germ of what became a rather extensive system of extension work was the farmers' institute. It was the prototype of a number of other ventures in the field of education. I will reserve until later a description of the farmers' institutes themselves, but here I might say that a series of business conferences grew up on the institute idea. The interest of the soldiers in business was very great. You may have noticed that the enrollment in the College of Business at the American E. F. University was more than double that of any other college, save possibly one. The men flocked into the business courses and I judge that is simply a prophecy of what is now happening in this country. Under Mr. Lough's direction, very successful courses in accounting, business law, business administration and allied lines were offered in a good many centers by staffs of itinerant lecturers.

Another development of the extension service was in a field that was called "citizenship." It was a difficult field to organize. It first had to be defined. What was meant in general was that the fields of economics, sociology, history and government, must be made to contribute to the understanding of the men concerning some of the great problems that would face them as American citizens. A very remarkable series of Saturday lectures was organized at the University, but the main reliance for broadcast citizenship instruction was through citizenship conferences or institutes. Before summer came on there were some 75 men lecturing in the field, where they found audiences of men ready to listen to the message. The lecturers who were most successful in this field said little about the obligations of citizenship and very little about the theories of economics, but simply attempted to explain what was going on in the world, and to indicate the nature and importance of the problems that were following the close of the great war. Some of these lecturers talked to as many as 3,000 or 4,000 soldiers at a time and commanded close attention.

One might think that the last thing that could be carried on successfully under the conditions that prevailed overseas would be correspondence courses. It is true that the difficulties of transporting books and getting back papers for correction were not slight. Thousands of soldiers were living in isolated country villages. Some of us have been disposed to criticize mail service in America during recent years, but our difficulties

have been tame compared with the experience overseas. Nevertheless, the plan for correspondence courses brought thousands of applications to the director of the College of Correspondence, and it became evident that if the Army had stayed in France a few months longer a very large service would have been rendered through these courses.

I have offered you a very brief outline of the educational organization of the A. E. F. I wish I had adequate statistics to give you but they have not yet been compiled and indeed are necessarily incomplete. Units moved quickly sometimes. A school would get well under way, when suddenly an order would come to move the division or the regiment, and so we lost track of what had been done. However, when the final records are brought together, it will be possible to secure fairly accurate figures and I am sure that you will all be amazed at the number of men reached with some degree of effectiveness in the educational work of the A. E. F.

I want to speak of several outstanding features. One that impressed me particularly was the response to the opportunities for art education. Doubtless this was due in a large part to the leadership of a very remarkable man, Mr. George A. Hellman of New York City. Hundreds of men were registered both at the University and in the art school near Paris and many more were rejected for lack of room. The work done by these men in painting, in sculpture, in drawing, was a revelation. It was a sort of unexpected flowering of the art instinct at a time when there was also a great call for work of vocational character. Of course the mere fact that these men were in France was an incentive because most of them had never been there before and would never be there again, and for the only time in their lives were having access to the rich treasures of artistic France.

Another important feature was the effect which this educational work had upon the attitude of our men toward France itself. The conditions under which the majority of the soldiers lived in a country of rainfall and mud, quartered inadequately in crowded villages, and the many irritations that would come up under such conditions, had prejudiced many men against the French. But wherever the intelligent American soldier came in contact with the better things in the life there—and this is particularly the case of the men who went to the French universities, but to some extent was true of all students in the educational work—their attitude changed materially. When they once saw what France was, in her history, in her part in the war, in her achievements in civilization, they became converted to a new point of view. I trust and believe that one of the results of the educational work overseas will be a permanent desire for the interchange of both lecturers and students between France and America.

I want to speak now of a few features of the work that were a little closer to my own personal interest and responsibility. Dr. John Erskine, chairman of the Commission, was the director of the American E. F. University, and also had charge of the project for getting American students into French and British universities. Dr. F. E. Spaulding was the general executive and business administrator of the Commission with particular charge of the division and post schools. To me was assigned, roughly, the general field of so-called vocational education, including business, engineering and trades, and agriculture. President W. M. Riggs, of South Carolina, was my right hand man in the general field of vocational education, Dean L. E. Reber, of the University of Wisconsin, had immediate charge of the



whole field of engineering and trades education, and Mr. H. W. Lough, of New York, was the head of business education, so that I kept to myself the field of agriculture. I have not time tonight to describe the work done in the engineering and trades or in business. In general, however, the work in agriculture about which I now wish to speak particularly, was fairly typical of the sort of work done in the other fields of vocational education.

First of all, we had a College of Agriculture at the American E. F. University with Dean Harry Hayward, of Delaware College, as director. There was an enrollment of nearly 700 men, fairly typical college men who were anxious to get work there that would give them credit in their own agricultural colleges at home. Some of these men, however, were taking advantage of the opportunity to study because they expected it would be their last chance to secure any part of a college education.

The farm school which we established is worthy of special mention. This was also located in an American hospital near the village of Allerey, not far from Beaune. It was said to be the largest American hospital in France, with a capacity of 20,000 patients. Some land had been rented for garden purposes and still more land was available. It was decided to establish courses which would be especially adapted to men who had never had farm experience or agricultural education. Director H. J. Baker, of the Connecticut Agricultural College, was put in charge of the school. He made provision for 3,000 students, developing the courses on the theory that these students should be given a half day of practical farm work and a half day of academic work. He requisitioned farm tools and other equipment from the army. When the students came to us, however, we found that out of 2,500 who actually enrolled 75 percent had had farm experience, so the entire curriculum of the school had to be changed. But the enterprise "went" wonderfully. The Allerey "Handbook" contained outlines of all the courses given and, indeed, took the place of textbooks of which we never had an adequate supply in France. If the A. E. F. had remained in France until September, we could have given about 6,000 men three months' courses in this school and as many more a month each. As it was, we had probably the largest farm school ever developed.

Then there were the farmers' institutes to which I have already referred. As a matter of fact, these institutes were the very first projects in our agricultural education. Our first meetings were held in the vicinity of Bordeaux in January under the direction of Dr. Douglass, who personally selected a staff of speakers from the army and arranged a series of some 14 three-day institutes, the institutes overlapping in such a way that a staff of nine could carry on three-day institutes indefinitely at the rate of six a week. This series of 14 meetings had an accumulated attendance of about 28,000 and we think reached at least 10,000 different men. That experience settled the question of whether or not farmers' institutes would be successful. We immediately got out a Farmers' Institute Guide, and as rapidly as we could supply overhead supervision, arranged for these institutes in all parts of the army. We think we reached at least 200,000 men through these farmers' institutes.

I am sorry to say that textbooks were very slow in getting over and we had inadequate facilities for mimeographing or printing lectures. Partly for this reason, we tried the plan of developing farmers' clubs, especially in the little villages or billets, even if there were no more than a half dozen

men in one place who cared to join. This had already been started in several places. Before we got through probably 500 or 600 of these clubs had been organized in different parts of the Army, and before the men left for America they organized the A. E. F. Farmers' Club with the idea of bringing back to this side the club idea and particularly the interest acquired over there in the world point of view concerning agriculture. I think there is promise that this movement will be of considerable service.

We had rather ambitious plans for a summer conference on world agriculture and had hoped to bring overseas for the summer quite a large number of lecturers, both for the field work and for a summer school or conference at which agriculture from the world point of view would be placed before a choice group of American soldier students. With the rapid return of the men home, however, we had to compress our plans. We finally had a four-day conference early in June, with delegates from Great Britain, France, Belgium, Canada, China and America. Not less than 1,000 students got the advantage of the lectures by these persons on various phases of agriculture in those countries, and gained, I am sure, a broad point of view concerning world agriculture and country life.

Before I go farther I want to tell you that the real success of the work in agricultural education in the A. E. F. was made possible by the coming over to France of a very effective and loyal group of men. Among the administrative staff were such men as Dean E. A. Burnett, of the University of Nebraska, Dean J. L. Coulter, of West Virginia University, and President E. C. Perisho, of the South Dakota Agricultural College, although Dr. Perisho became so interested in his lectures to the soldiers and so successful in the task that he finally went out as a lecturer. He had very remarkable success in reaching the men. We also had a group of about a dozen men who were on the subject-matter staff, men representing the various departments of the field of agriculture and drawn from our best Agricultural Colleges. I want at this time to express my personal thanks to the institutions that loaned us these men because it was their generosity and enthusiasm that made this work possible; otherwise it would have fallen flat. The members of this staff went out into the field, helped to direct the work there, lectured and conferred, underwent all sorts of adverse experiences, consulted also with the teachers in the College of Agriculture and the farm school, and worked in season and out of season for the success of the agricultural part of our enterprise.

A number of questions have been asked me from time to time since returning that perhaps are in your minds and to which I might now try to give some answers. In the first place, I ought to tell you that the Army Educational Commission went over under the auspices of the War Work Council of the Y. M. C. A. This whole educational enterprise was started by the Y. M. C. A., which deserves great credit for it. The actual task, however, of developing the work and full responsibility for it was taken by the Army from the start, our Commission and its staff being an expert advisory body. Gen. Robert I. Rees was sent over by the War Department to supervise the whole educational enterprise in the A. E. F., and he proved to be an inspiring and successful leader and director. After a time the entire personnel of the educational staff, amounting to something like 500, was actually taken into the Army as a group of civilian employees. After April 15, the Commission was called the Educational Corps

Commission of the A. E. F., and the workers under them were members of the Educational Corps of the Army.

I was told before I went over, as were some of our workers, that our efforts would be a waste of time because the soldiers were restive, anxious for nothing but to get home and therefore would not study. But that was the least of our troubles. The boys were hungry for something intellectual. Many of them were almost literally starved for a chance to read, a chance for books, and men who had not seen a book for years, men who had not had time to think of anything but war for a year or two years, simply devoured anything that came in their way. It was almost pathetic at times to see men working in the library of an evening. They were interested in everything—in citizenship, in history, in vocational work. Many a college teacher at the University testified that never in his experience had he had such satisfactory work from students as he got over there. The speakers who went out into the field had ideal audiences. This craving of the men for the message was the great reward of the work.

Were there any educational lessons learned? I think there was an inclination on the part of some of the staff to think that we were doing something quite unique, something that would open up a new chapter in American educational progress. To my mind, it was not that so much as it was an idea expressed by President Riggs before a group of educators and special students that had gathered one evening, when he said that the great achievement in the educational work of the A. E. F. was not the evolution of some new pedagogical theory nor the development of new educational practice, but the revelation of the integrity, the intellectual power, the desire for knowledge, and the wholesomeness of the average American young man.

There were a few things, however, that one could learn with respect to educational affairs. In the first place, there was the matter of illiteracy. The percentage of illiterates in the army was simply appalling. And by the way, the only adequate illiteracy test is comprised in a formula something like this: ability to write a good letter home, ability to read a newspaper article intelligently, ability to cast up accurately a bill of groceries or similar supplies. A great deal was done in the Army to remedy illiteracy, and even more to demonstrate that once you have the men together and once you have compulsory teaching, you can abolish illiteracy very rapidly. Tens of thousands of our soldiers who went over illiterate according to the standards just suggested, came back literate.

Another thing that came out of our experiences, especially at the American E. F. University, was the possibility of getting along with very modest equipment. The laboratories at Beaune were hospital barracks, often of the cheapest kind of construction. The equipment was in all cases secured from the Army, and yet the University was fairly well equipped. It took a great deal of work and patience, for example, to bring together the machinery for an engineering laboratory, and yet that laboratory at Beaune would be a credit to any engineering school. Of course, I am quite aware that most of us would feel loath to recommend to our trustees cheap and temporary buildings when we would so much prefer permanent and expensive buildings; nevertheless the lesson exists.

Many of us also came to see clearly that we may be altogether too particular about details of requirements for entrance into college. I do not

mean that we can throw to the winds our ordinary standards or even our methods of entrance. But I am sure that many college teachers as a result of their experiences overseas have come to realize that many of us are altogether too fussy about details of entrance requirements. Certainly the experience at the University at Beaune developed the fact that earnest young men even of diverse academic attainments could carry certain types of college work equally well.

One of the documents issued under the auspices of the University was a paper prepared by Dr. Spaulding entitled, "Educate America." It was printed in full in the July number of "School Life," published by the United States Department of Education. It was a clarion call for the complete reorganization of the American educational system and ought to be read by every person in America engaged in educational work.

There was one phase of this document that has to do intimately with the relation of universal military service to our system of education. For example, acting I am quite sure at the instigation of Dr. Spaulding, certainly in line with his paper, the National Educational Association, at its meeting in Milwaukee last July, passed the following resolution:

"We urge the Government of the United States to institute and maintain a full twelve-month year of instruction, training and discipline for each young man and woman between the ages of 17 years and 6 months and 20, such training to be carried on at such place and in such manner as may result to the particular advantage of the individual in the development of civic responsibility and vocational efficiency, and to bear the entire expense of this undertaking, including adequate maintenance allowance for the dependents of such students in training."

I do not subscribe entirely to this declaration, but I predict that it is going to be before long one of the big issues in our educational work, and we must be prepared to discuss this and other similar projects from a fundamental point of view.

It is becoming clear to all of us that we must have a much more adequate scheme of education in whatever American Army does exist. There must be larger educational opportunities for the rank and file and, indeed, we have just this sort of thing actually under way now. Vocational education is being made a part of a system of education within the Army itself. I think the members of this Association before long will be called upon to answer questions something like these:

Shall we endorse the idea of taking for a year every boy between the ages of 17 and 20, giving him military training, education and preparation for war and also a thorough-going year of education either for vocation or for college?

Or shall we try to have a system whereby the boy is not disturbed in his school work except for brief periods, say from the age of 16 to 21?

To what extent shall general education become an organic part of this scheme of universal military training?

If we do plan to give this combined military-vocational education for a solid year, who is to be responsible for the system, the educationalists or the Army?

One of the results of the work overseas was, in my judgment, the calling of fresh attention to the possibilities of international cooperation, for example, in the matter of education. Our Commission prepared a statement concerning this matter. Mrs. Fannie Fern Andrews, representing the United States Bureau of Education in Paris, was endeavoring to arouse interest in substantial efforts for permanent schemes for educational co-operation. In the matter of agriculture, I might say that since nothing else was in sight I prepared a memorandum which was laid before the American delegates to the Peace Conference, which set forth the needs and possibilities of world cooperation. At the conference on world agriculture at Beaune, resolutions were passed which endorsed the idea of some permanent scheme of world cooperation in agricultural and country life affairs, and, indeed, a provisional international committee was formed for the purpose of discovering whether steps can not be taken to realize in some concrete way the ideals that lie back of international cooperation in agriculture. To my mind this was the largest single thing in the agricultural field that grew out of our American education overseas.

**THE PRESIDENT.** We will now listen to the report of the Committee on Instruction in Agriculture, Home Economics and Mechanic Arts, which will be presented by its chairman, Director A. C. True of the States Relations Service of the United States Department of Agriculture.

On motion, owing to the lateness of the hour, the report was read by title only and ordered to be printed in full in the Proceedings, as follows:

**REPORT OF COMMITTEE ON INSTRUCTION IN AGRICULTURE, HOME ECONOMICS  
AND MECHANIC ARTS\***

**THE TRAINING OF VOCATIONAL TEACHERS UNDER THE SMITH-HUGHES ACT**

At the Baltimore meeting of this Association in January, 1919, the standing Committee on Instruction in Agriculture was changed to a Committee on Instruction in Agriculture, Home Economics and Trades and Industries and its membership was increased from 6 to 10. This larger committee was instructed by the Association to make a study of the training of teachers of vocational subjects under the Smith-Hughes Act. The Committee organized for this study by electing Dr. A. C. True chairman and Professor D. J. Crosby secretary, and dividing into sub-committees on agriculture, home economics, and mechanic arts, respectively, with membership as follows:

Agriculture: J. F. Duggar of Alabama, T. F. Hunt of California and G. A. Works of New York.

Home economics: Agnes E. Harris of Texas, Anna E. Richardson of Washington, D. C., and Edna N. White of Ohio.

Mechanic arts: A. A. Potter of Kansas, W. M. Riggs of South Carolina and H. W. Tyler of Massachusetts.

Each sub-committee prepared a separate tentative report for consideration by the whole committee at a meeting held in Chicago, November 10, 1919. At this meeting the three sub-committee reports were received and the following recommendations under nine heads were formulated and adopted:

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\*This is the twenty-second report of the committee.

## RECOMMENDATIONS ON THE TRAINING OF TEACHERS OF VOCATIONAL SUBJECTS

1. That in order to give the student early in his career a good understanding of what is involved in education for agriculture, home economics, and trades and industries, and to prepare him later on to choose and intelligently to pursue his course, the Land-Grant Colleges should offer general basic courses that include what the general farmer, the teacher, the extension worker, the home-maker, and the industrial worker need to know in order to carry on their work intelligently and successfully. Matriculants in these colleges who have completed satisfactory vocational courses in high schools should be given opportunity to pass off similar basic courses in college, not for college credit but to enable them to substitute other college work.

2. That a study of vocational efficiency in agriculture, home economics, and trades and industries should be made for the purpose of arriving at definite objective standards of vocational experience.

3. That efforts be made to check any tendency toward undue segregation of students who are preparing to teach from those who are going into agricultural pursuits, home economics, or trades and industries.

4. That students preparing to teach vocational subjects should major not earlier than the beginning of the junior year in their respective technical colleges or divisions, rather than in colleges or schools of education, and their professional training in methods of teaching vocational subjects and their supervised teaching should be directed by departments or divisions of vocational education which shall have close organic connection with subject-matter departments.

5. That more attention be given to developing facilities for, and methods of, conducting supervised teaching under conditions similar to those in the high schools where the teacher-training candidates will be expected later to work.

6. That as rapidly as possible provision be made for itinerant instructors whose function will be to keep in touch with and assist vocational teachers in the field, particularly during the first year or two of their work.

7. That every available means be utilized for giving technical and professional training along vocational lines to successful teachers now in service. Of necessity, this work will need to be provided for largely in summer courses especially organized for this purpose, which teachers can attend during their vacations.

8. That the Executive Committee of this Association be asked to make an effort to secure a modification of the ruling that all students other than those preparing to teach vocational subjects be excluded from classes maintained on Smith-Hughes funds.

The investigations of the Committee show clearly that while some of the larger institutions have been able to meet this requirement without serious difficulty, on the other hand, many, probably three-fourths of them, have raised serious objections to it.

If it is felt that the Smith-Hughes funds must be safeguarded, your Committee would suggest that this be done in accordance with precedents established in connection with the Morrill Acts, namely, by designating the subjects and the types of work for which these funds may be used and not the students who are pursuing some particular curriculum.

It might be arranged, for example, that the Smith-Hughes funds could be used freely and without restriction as to students, for the support of courses in methods of teaching vocational subjects and for supervised teaching in these subjects, but not for technical instruction in agriculture, home economics, or trades and industries, except as special courses in technical subjects need to be developed for prospective vocational teachers.

If then some further safeguard needs to be thrown around the use of Smith-Hughes funds for these new technical courses, it could be done by limiting the size of classes taught by Smith-Hughes teachers in these studies.

Such an arrangement, in the opinion of your Committee, would have a tendency to encourage the use of Smith-Hughes funds for the support of work done by vocational departments and would help build up such departments. At the same time it would enable the smaller colleges to meet the additional burden thrown upon them by this teacher-training work without seriously interfering with their other work.

This, after all, is a better way to build up the teaching profession than to attempt to do it by the segregation of students. The young men and young women who go to the Land-Grant Colleges, unlike those who go to normal schools, have in very few cases chosen the teaching profession before leaving home. They have set out to get an education in an institution that has established a reputation for turning out well-trained graduates for doing the world's work, and not primarily for teaching. If now it is the desire to encourage some of these persons to prepare for vocational teaching, let it be done by building up departments of vocational education that will attract students to their work.

9. That in our opinion the preparation of high school teachers of vocational subjects should be done only by institutions that are giving collegiate courses in agriculture, home economics and engineering.

#### REPORT OF SUB-COMMITTEE ON INSTRUCTION IN AGRICULTURE

##### TRAINING TEACHERS OF AGRICULTURE

Every Land-Grant College in the United States now makes provision for the training of teachers of agriculture for secondary schools. Nineteen of them are also making some effort to train teachers for college work. Every Land-Grant College has also been officially designated by its respective State Board of Vocational Education to prepare teachers of agriculture under the provisions of the Smith-Hughes Vocational Education Act. In all but three of the States the Land-Grant College is the only institution thus designated. The exceptions are in Wisconsin and Tennessee where the responsibility is divided between the Land-Grant Colleges and State Normal Schools, and in Utah, where there is a division of responsibility between the State University at Salt Lake City and the Agricultural College at Logan.

##### ORGANIZATION FOR TRAINING TEACHERS OF AGRICULTURE

Definite provision for the training of teachers of agriculture is of comparatively recent date. Prior to the enactment of the Nelson Amendment in 1907, there was in existence only one of the departments now in

charge of training teachers of agriculture, namely, the Department of Vocational Education of the South Dakota College.

During the first five-year period subsequent to the enactment of the Nelson Amendment, seven other colleges established departments for the training of teachers, and in the next five years, 13 more were added, so that 20 such departments awaited the enactment of the Smith-Hughes Act in February, 1917. Since then 28 other colleges have developed teacher-training departments, thus completing the list of land-grant institutions engaged in training teachers.

The departments that have been organized to have charge of the training of teachers of vocational subjects have been variously designated. In most cases, the name of the department or other organization having charge of this work indicates in a general way the scope of the activities intrusted to it. For examples, five of the Land-Grant Colleges have colleges or schools of education, another, a school of vocational education and still another, a school of agricultural education. In such cases, the organization in charge of teacher-training is coordinate or practically coordinate with the college or school of agriculture in the university or the college, and usually also, it is training not only vocational teachers but teachers of science, literature and the arts; not only vocational teachers of agriculture, but vocational teachers of home economics and of trades and industries.

In eight of the colleges there are departments of education, and in six others, departments of vocational education. Here again we find that the organizations in charge of teacher-training are doing something more than train teachers of agriculture. Most of them are training teachers for the other vocational subjects and some for non-vocational subjects.

A third large group, comprising 24 of the Land-Grant Colleges, have organized departments or divisions of agricultural education. These are usually, although not always, divisions of the Colleges of Agriculture. In some cases they are divisions of schools or colleges of education closely coordinated with the Colleges of Agriculture.

There remain a few Land-Grant Colleges that have adopted unusual names for the organizations intrusted with the training of teachers. These include the Department of Rural Life, at Pennsylvania State College, which comprises subject-matter in education, rural economics and rural sociology; the Department of Rural Education of the New York State College of Agriculture, which has charge of the training of teachers of agriculture and home economics; the Department of Rural and Industrial Education at the State Agricultural College of Colorado; and the Department of Normal and Vocational Training at Rhode Island State College.

These organizations, especially those established more recently, have relatively small teaching staffs. Nineteen of them have only one member of professorial rank, with or without instructors and assistants. There are, in all, 119 teachers having the rank of "Professor" or "Assistant Professor," 21 instructors and 24 assistants, an average of 3.5 for each land-grant college department charged with the training of vocational teachers. The work is just beginning. Well qualified teachers for the vocational phases of teacher-training are scarce.

In a large majority of the institutions, the prospective teacher of agricultural subjects registers in the College of Agriculture and gets his degree from that college. In one or two institutions, he may register and take his



degree in the College of Agriculture or in the College of Education, and in one institution he is required to take his degree in the College of Education. A question here arises as to whether the prospective teacher of agriculture would prefer to go out under the college of agriculture label or under that of the college of education.

#### THE CURRICULA

In nearly two-thirds of the Land-Grant Colleges (29 institutions), the courses for the training of teachers of agriculture are prescribed with the exception of a limited amount of elective work, which in some cases includes professional courses in education that must be taken in order to qualify for a state certificate. In some of the other institutions, the regulations of the State Boards of Vocational Education and definitely announced plans of the departments in charge of teacher-training work are such as to give the prospective teacher much less freedom in his electives than is given to other students in the colleges. In other words, the necessity for so guiding the work of the student that he will get a broad general training has resulted in giving him almost no freedom of election. To a considerable extent, this unfortunate condition has grown out of the tendency toward extreme specialization in technical agriculture.

Experience has shown, for example, that when the graduate of the Agriculture College enters upon his work as a teacher of vocational agriculture he finds that he is expected to teach farm crops, soils, fruit growing, farm management, animal husbandry, farm shop, poultry husbandry, and farm mechanics. The instruction that he gives in these various subjects must be of such nature as to give his students a basic knowledge of each. When he attempts to anticipate this need during his college course he often finds that it is practically impossible for him to do so, because many of the subject-matter departments plan their courses from the point of view of the student who is going to specialize in the field represented by the department's work. As a result it is frequently impossible for the student who desires to gain any real knowledge of a topic to do so without becoming a specialist in it.

Two illustrations will suffice to indicate the extent to which this development of specialized courses has gone on. In one of our larger colleges a student finds it necessary to take 15 semester hours in farm crops to encompass the range of crops he will be expected to know about as a teacher of agriculture in the State in which the college is located. In another the prospective teacher finds it necessary to take 13 hours in animal husbandry to meet the demands that will come to him in his work as a teacher of vocational agriculture. A careful study has led your Committee to the conclusion that in many of the Colleges of Agriculture it is impossible in a four-year course for the student to secure the preparation in the basic sciences and the knowledge of technical agriculture that is necessary to meet his requirements as a teacher because of this tendency of departments to offer a large number of highly specialized courses without a basic or introductory course.

In studying this phase of its work the Committee found that students very generally expressed the desire for a basic course in each department that would give the student taking it a fundamental view of the depart-

ment's field of work. In many cases faculty members also recognize the desirability of such courses.

Against this procedure the argument is advanced that such an organization of instruction would lead to superficial work on the part of the students. Those who advance this argument lose sight of three important factors:

1. Such an organization would make it possible for a student to specialize to the extent of 12 or 15 hours in a department and also get the general preparation in other departments that it is necessary for the vocational teacher to have.

2. A large part of the curricula of most agricultural colleges is devoted to other than technical studies in agriculture, i. e., to general education and to fundamental sciences.

3. It does not follow that because this basic course is of a general character that it will be a "snap" course. It should not be a devitalized sort of agriculture, but a strong fundamental course upon which specialized courses can be based. Your Committee has no use for a so-called "vocational" agriculture that is any less fundamental than that taught to prospective farmers.

It is the apparent intention of the institutions to make the graduation requirements in teacher-training courses the same, so far as credit hours are concerned, as they are for other courses in the institution. This, however, has not always been possible. Three of the institutions have found it impossible to carry their students through the desired subjects in general and technical education, together with the necessary professional courses, without exceeding the usual credit hour requirements by from 4 to 14 semester hours.

#### VOCATIONAL EXPERIENCE IN AGRICULTURE

Relatively few of the institutions enforce any entrance requirement in farm experience. Several have theoretical requirements of this nature, but practically all of them permit these to be fulfilled at any time before the beginning of the senior year, and some of them at any time before the candidate is given his certificate as a vocational teacher. All but three or four of the institutions are enforcing, or planning to enforce, farm practice requirements before the candidate gets away from the institution. So far as definite figures are known, 22 colleges require farm experience extending over two years, one for three years, four for one year, and others indicate six months, two or three summer vacations, or "sufficient experience to acquire proficiency in agricultural practice."

Comparatively few of the colleges announce facilities or plans for giving the students farm practice experience while in college, except as they may get odd jobs on the college farms or may have the assistance of college authorities in getting vacation work on approved farms. In Alabama, California and Georgia, however, definite plans have been made for including agricultural project work on the college farms as a feature of the teacher-training curricula.

#### PROFESSIONAL STUDIES

The professional work of those preparing to teach vocational agriculture usually includes as a minimum one course in psychology, one course in

special methods, and supervised teaching and observation work. In a great majority of the institutions, the work of the first two years is practically the same for all students, and the professional studies begin with the junior year. Forty of the institutions announce that professional work begins in the junior year, five permit or require some courses in education in the sophomore year, and two defer all professional studies until the senior year.

Usually all of the professional work is given by the college or department in charge of the teacher-training work, but in some cases the courses in psychology and general education are offered by the college or school of education, while the department of agricultural education which has general charge of the teacher-training work, offers the courses in special methods and supervises the practice teaching.

All of the institutions are requiring or making plans for supervised practice teaching. Several are not yet in a position to make this a definite requirement, but this condition of affairs appears to be a temporary one because of the shortage of teachers and of other exigencies growing out of the war situation. In 39 of the Land-Grant Colleges, supervised practice teaching is now an accomplished fact.

The providing of facilities for practice teaching has been one of the difficult problems attending the inauguration of this new enterprise. Seven of the colleges announce it as their most difficult problem. Many of the Agricultural Colleges have secondary schools attached to them or are conducting short courses in winter. Twenty institutions make use of these schools or of short courses in practice teaching. In connection with seven, there are university high schools that are used in the practice teaching work. Sixteen institutions utilize local village or city high schools, and 15 take their vocational candidates out to high schools within commuting or driving distance.

In addition to this use of local secondary schools and courses for the practice teaching work, there are 12 institutions that now require or are planning soon to require apprentice teaching by the candidates for vocational certificates. Under this plan the candidates are sent out from six weeks to one semester to teach under the supervision of successful teachers of agriculture in vocational departments in high schools. During the time that they are out on this work, they are responsible for teaching at least one class in agriculture, and they perform such other duties as may be required of them by the teachers in charge.

The minimum number of periods of supervised practice teaching varies from 12 to 200, from one or two hours a week throughout a college term of 12 weeks, up to one period a week for a full year.

#### CERTIFICATION OF VOCATIONAL TEACHERS

Upon completion of a four-year agricultural course, including certain specified minimum requirements in psychology, pedagogy, practice teaching and, in most cases, in farm practice, the student usually receives not only his baccalaureate degree from the college but also a certificate to teach agriculture in the high schools. In only one state, California, does the State Board require an additional year of graduate work before issuing a certificate. Usually a life certificate is issued at once, but in some states vocational

teachers have to teach for a probationary period of one to five years before a life certificate can be had. In one state, Oklahoma, teachers are licensed one year at a time.

#### HELPING TEACHERS IN SERVICE

Plans for helping inexperienced teachers of agriculture to get a start and for giving technical instruction in agriculture to high school teachers now serving in other than vocational capacities are mostly tentative and untried. So far as plans for helping inexperienced teachers have been tried, they usually include visits two or three times a year to these teachers by college instructors who have had a part in their professional training. In some cases there are plans to employ itinerant instructors who will devote their whole time to such visits and to the holding of group conferences of vocational teachers for instructional purposes.

Sometimes there are one or more state supervisors, employed jointly by the College and the State Board for Vocational Education, who combine the duties of inspector with that of itinerant instructor. This plan has been rather severely condemned on the ground that the person who acts in an advisory capacity should never appear as an inspector.

The training of teachers now engaged in academic work in high schools is generally looked upon as an important though a more or less temporary piece of work, to be discontinued when the supply of teachers trained in the Agricultural Colleges plus the supply of top-worked varieties is adequate to meet the demand. Work of this character is largely being done in summer schools for teachers by admitting for intensified instruction in agriculture, successful teachers who are farm reared and who have college degrees from literary or scientific courses. It is usually work of college grade and carries credits which may accumulate through successive summer sessions until the candidates are entitled to baccalaureate degrees and state vocational certificates.

#### DIFFICULTIES

There are always difficulties attending the inauguration of new lines of work. In the main, replies to the questionnaires sent out by the Committee indicate that the difficulties in starting the teacher-training work in agriculture have been no more serious than were expected. They have included such matters as lack of sufficient funds to offset the Smith-Hughes funds, difficulty in obtaining satisfactory teachers and in getting worth-while students to take up this work, and difficulty in applying the somewhat rigid federal rulings and interpretations to the varying conditions existing in the several institutions. One institution reports as follows:

"Our difficulties do not arise from meeting requirements of Smith-Hughes Act but from meeting the various rulings of the board charged with the enforcement of the Act. Rulings relative to separation of classes, requiring men to nominate long in advance whether they are to teach or to follow other lines of work, and similar rulings, involve the college in difficulties both administrative and financial."

There is considerable evidence of resentment on the part of many of the Land-Grant Colleges, not as to the terms of the law, but as to certain interpretations and regulations made in advance of any experience calling

for such action. The ruling that has probably caused more dissatisfaction than any other is the one that all students other than those definitely preparing for teaching shall be excluded from Smith-Hughes classes. Before questionnaires were sent out, information came to the Committee that there was dissatisfaction with this ruling and so the following question was included: "Do you feel that the college students should be entirely excluded from Smith-Hughes classes when these classes are small?" There were 44 answers to this question, and 38 of them were in the negative. The following quotations from eight different replies will indicate how the difficulties of administration center in this ruling:

"The most serious difficulty is the distribution of funds so as not to transgress any of the rules and regulations of the Federal Board. As our institution is comparatively small and we have not enough students to make many sections for the different types of work, it is quite necessary that our students take a large majority of their work together."

"Exclusion of *bona fide* students in agriculture from education classes, because they profess a desire to train for extension teaching or do not plan definitely to go into secondary vocational agriculture as teachers."

"We do not believe that Smith-Hughes classes should be differentiated from other classes."

"Students need a finding course in vocational agriculture, or, rather, the students who are still looking for their field should be allowed to take at least a taste of the work before anything is said to them about registering for the course."

"Necessity of taking separate courses in some subjects for Smith-Hughes and for other students."

"It is our opinion that the Federal Board should make general recommendations and allow each institution to work out the detailed plans of instruction to suit local conditions."

"Requirement of segregation if rigidly enforced."

"Segregated classes and expending certain minimum amounts seem to cause the greatest difficulties."

#### EXCERPTS FROM LETTERS DISCUSSING EXCLUSION FROM SMITH-HUGHES CLASSES

"We based our negative answer to the question, 'Do you feel that the college students should be entirely excluded from Smith-Hughes classes when these classes are small?' upon our experience in trying to get the Smith-Hughes work started. The problem is not only one of protecting the Smith-Hughes fund but also one of getting students to take the work. This has been quite difficult during the period of the war. We are hoping that the situation will improve from now on but we have found it very unsatisfactory, so unsatisfactory in fact that we have not tried to hold to the plan of distinctive membership for teacher-training in the Smith-Hughes classes.

"We have rather tried so to organize our work that a large percentage of our graduates could qualify for Smith-Hughes teachers. We have carried this so far that all of our graduates in home economics can so qualify and

that our graduates in agriculture can do so by carrying 20 semester credits in psychology, theory and practice of education, and practice teaching.

"Our faculty is divided on the proposition of making the work in education elective rather than required. Under present conditions, we are convinced that separating the classes would prove unsatisfactory because of the smallness of the classes and the consequent lack of enthusiasm.

"Many of us are convinced that the courses in education as required under our State Certification Act and which meet the present requirements of teacher-training under the Smith-Hughes Act are helpful to students training themselves in technical agriculture. Some of us even hold the same ideas regarding courses in engineering, but the majority of the faculty does not agree to this. It does agree, however, to the proposition of making it easy for men who are training themselves in agriculture or in engineering to take these courses in education.

"In due time I believe that more care may be necessary in safe-guarding the Smith-Hughes funds, but now I believe that every effort must be made by the institution and considerable freedom must be allowed by the Federal Board for Vocational Education to get the work started. I believe it will develop rapidly but certain favorable conditions must be provided to insure the necessary enrollment."

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"Our reason for saying 'No' to the inquiry regarding others than Smith-Hughes students attending Smith-Hughes classes, when the class is small, is, that in our college, where the enrollment is not large, we may have five who are taking a certain course, four of them in Smith-Hughes and one of them in general work. There are many Smith-Hughes subjects that this one might elect to take. Unless he could take the work with the Smith-Hughes students, it would mean having a class with but one student, or else no class at all. Such a class, of course, would be working under a great handicap, and the additional expense incurred in the employment of the extra teacher would be considerable, in many cases. I think in cases of this sort, where the teacher follows the curriculum prescribed for Smith-Hughes work and does not digress from it for other purposes, if the majority of the class are Smith-Hughes students, this should be the determining factor. Otherwise, a very considerable handicap will be placed on the small schools. I can see where the enrollment is large, necessitating the dividing of classes into sections, with different teachers, no hardship would be involved; but where there are not enough students to make divisions into sections advisable, the handicap is of a rather serious nature. I should be delighted if something could be done to modify this ruling."

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"I think your question with reference to admitting other college students into Smith-Hughes classes is a very practical one. You of course know of the old time difficulties when Hatch and Adams moneys were used to pay salaries of men who spent part of their time teaching college classes. Later the experiment stations secured sufficient state appropriations and now many of us (directors of experiment stations) have much more state money than we have federal money and now support both Hatch and Adams projects from other funds.

"You also of course know of the experience when Smith-Lever funds

became available. Many college executives took advantage of an opportunity and used this money to pay a little higher salaries, quieting their consciences by saying that the men thus favored actually went to farmers' meetings and institutes and answered many letters. This difficulty now I believe is pretty largely eliminated through the state appropriations which make this old temptation a matter of history with most of us.

"I myself hold very strongly to the opinion that it is the task of the leaders in this great movement to advise the people of the country and their representatives in Congress and in state legislatures as to the amounts of money needed respectively for research, for resident instruction, for extension instruction, and for other special types of work. If, however, legislative bodies made larger appropriations for one than for another I feel very strongly that it is the duty of administrative officers to use the funds according to the appropriation program even though in their judgment they have more of one fund than they really need and not enough of another. From this statement you will see that I feel very strongly that Smith-Hughes money should be used for Smith-Hughes purposes. At the same time practical problems arise which call for practical solutions and if there are only five or ten students taking specifically the Smith-Hughes teachers' training course during the early period in the development of the work, it seems to me that it would not be a crying sin if, say, five or ten students were to enter some of the same courses in order to make it unnecessary to give identical courses to two groups of students. This is particularly true in view of the fact that one-half or more of the money which is used is derived from state appropriations. What I have in mind is that at the present time the country is extremely short of well trained and well qualified college professors in agricultural education, that we should utilize their ability to the utmost and conserve it in every way possible and that at the same time we should carefully safeguard the funds and use them in the way in which they were intended to be used."

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"Before answering the question I should like to inquire into the probable reason for raising the question and also the possibility for good or evil to all concerned. Should we exclude students from Smith-Hughes classes, it is establishing a precedent which is contrary to the usual administrative policies governing classes which have been supported mainly by other federal or state funds. Such being the case we are logically led to assume, in raising the question, that there may be some objection to administering the Smith-Hughes classes as has been the tradition to administer other classes supported by state or other federal funds. If the administration of the various federal funds is not the same or similar, the difficulty of administration is increased, and it is with difficulty that the autonomy of the institution may be preserved.

"That this question has arisen at all with respect to the administration of the Smith-Hughes funds must be due to one or more of various conceptions as to the objects which are to be gained. Some of these I will enumerate.

"1. It will safeguard the Smith-Hughes funds: If it is felt necessary to take this attitude with regard to the Smith-Hughes funds, it is indirectly an attack upon the good faith of the Agricultural Colleges in their expenditure of other funds which have been entrusted to them. This

could hardly be intentional since our older institutions have been established for more than 50 years and there has been little or no inclination upon the part of either federal or state officers to change the method of administration. It seems to have been felt that the funds were sufficiently safeguarded and subject to which certain funds were to be applied designated without attempting to segregate the students who may attend classes as a basis of division of the funds; hence the tradition has arisen which makes all classes open to all students provided that they are educationally qualified to pursue the studies.

"2. It will increase the efficiency of administration: This point has already been touched upon, and there is little question but that there would be greater ease of administration, as far as division of funds is concerned, if we excluded other college students from Smith-Hughes classes, provided the present method is used, i. e., that we pro rate the salary upon the basis of the number of Smith-Hughes students which are present.

"3. It will increase the teaching efficiency: It may be assumed that if a teacher spends all of his time with Smith-Hughes students there will be higher instructional efficiency in the class. However, this assumption is doubtful. It is recognized that the best teaching efficiency is represented when classes are large enough so that a mass interest is aroused. A teacher must have an audience large enough to give him interest in presenting the subject and the student should have enough of his fellows in the class to bring out different viewpoints and to intensify thought. Competition is an aid in teaching, also, which must not be overlooked. It is recognized, however, that there is a limit to the size of classes—a class may be too large for a teacher to conduct it efficiently, but this case is not one which comes under the present discussion.

"4. It will build up department interest: Segregation of this sort, in my experience, has never tended to build up department interest, from the fact that no one outside of the department could be initiated into its mysteries.

"One of the vital arguments against such an attitude as has been suggested by the question, is that if other departments should take the same attitude, I fear in a short time we should have no department of instruction which could be recognized as a Smith-Hughes department, for at the best the Smith-Hughes classes must be recognized largely as service classes. Subject-matter must be secured from other departments and from other classes, and after a student has been well grounded in subject-matter he is taken over into the Smith-Hughes classes and there taught how to apply the subject-matter to the needs and the environment of the country boy and girl (referring here to the agricultural and home economics side of the work). There is little doubt that other departments would be likely to resent the promulgation of rules and regulations which could not be applicable throughout the institution.

"If subjects recognized as Smith-Hughes subjects have a place in a college curriculum and an educational value, certainly by allowing others than regular Smith-Hughes students to take these subjects, we should expect an inspirational result which would more than pay in the end for the trouble which the outside students would bring to the classes. If these subjects do not have an educational value which may be of profit to the other students, there is a question whether they have a place at all in a



college curriculum. This I believe, that most men trained in a department of education will not concede. Further, however, if they do not have an educational value they cannot have a cultural value.

"As I view the matter with the information at hand, I have come to the conclusion that to exclude other students from Smith-Hughes classes will not safeguard the Smith-Hughes funds; it is contrary to the administrative policies of the institution in which these funds are being spent; and neither the teacher nor the students will profit by such action. Therefore, I must answer the question in the negative. And, pardon me if I take the liberty to suggest that the Smith-Hughes funds for teacher-training be spent in the same manner as are the Morrill funds by designating subjects for which they may be used rather than attempting to place the basis for their use upon the student body itself. If this is done the administration of these funds will become as simple as is the administration of the Morrill funds."

#### **BENEFITS**

The beneficial results of the Smith-Hughes legislation for the training of teachers far outweigh the difficulties. With the exception of trouble in segregating classes, as discussed in preceding paragraphs, which applies to many of the colleges, 22 institutions reported "no difficulties."

The teacher-training machinery has not been long enough in operation to produce many definite results but in nearly every state good progress has been made. The Smith-Hughes Act has served to start teacher-training work in many states and in others it has supplemented and strengthened work already in progress. It has given standing to professional training for vocational teachers and turned the eyes of many young people toward teaching as a career. In some cases it is said to have had a beneficial reflex influence on the methods and quality of instruction in subject-matter departments and in others it has resulted in emphasizing the importance of broader training in agriculture. Quite generally it has caused a careful scrutiny of existing courses and curricula with reference to their educational values and their adaptation to particular needs. And finally it has brought into many of the college faculties instructors or groups of instructors who are primarily concerned with bringing about improved methods of instruction and better relationships with the public high schools and this fact is sure to exert a profound influence on both high school and college education.

#### **REPORT OF SUB-COMMITTEE ON INSTRUCTION IN HOME ECONOMICS TRAINING TEACHERS OF HOME ECONOMICS**

In view of the fact that the sub-committee was unable to get together to formulate its report, it seemed advisable to attempt to secure data and to construct its initial report by means of the time-honored—but perhaps not otherwise esteemed—questionnaire system. The queries were made of those responsible for home economics instruction in each of the public institutions in the several States designated by State Boards of Vocational Education for the purpose of training teachers of home economics. Replies were received from 49 such institutions representing 44 States, including 17 State Universities, 21 separate Land-Grant Colleges, 5 Women's Colleges, 2 Normal Schools, and 5 Negro Schools. Information was sought on various

matters concerned with organization, courses, supervision, follow-up work, experience, plans, needs, etc. In several instances the meaning of some of the questions was not clearly apprehended by those who shaped the replies and in some cases the replies seemed to bear little relation to the questions which were asked. However, the sub-committee feels that the following résumé sets forth the general outcome with a reasonable degree of accuracy.

#### GENERAL QUESTIONS

1. *Institutions preparing teachers of related arts and science subjects.* Affirmative answers from 26; question misunderstood in several cases, since state plans do not show as many institutions preparing teachers for related science and arts subjects.

2. *Relationships with other institutions within state borders preparing Smith-Hughes home economics teachers.* None, except when same board of control has charge.

3. *Proportion of worth-while students preparing to teach home economics or related subjects.* Varies from 100 to zero; figures not comparable; more than 50 percent in more than half the institutions reporting.

#### ORGANIZATION

4. *Location of courses in special (home economics) methods and practice teaching.* In the home economics department in 17, in the education in 19 and in both in 8 instances.

5. *Responsibility as to content of special (home economics) methods and practice teaching courses.* In the home economics department in 30, the education department in 8, and in both in 5 instances.

6. *Responsibility as to teacher employment.* The home economics department in 17, the education department in 8, both in 12, and the president or appointment committee in 7 instances.

7. *Relationship between departments responsible for technical home economics courses and for special (home economics) method and practice teaching courses.* Satisfactory in 40, unsatisfactory in 5 instances.

#### COURSES

8. *Necessary general content.* Technical home economics, related science and art, and professional courses in education are indicated in 21 instances. In 28 cases reference is made to outline courses of study or answers are vague.

9. *Necessary content in related art.* No careful consideration of the question of preparation of teachers of related art has been given in 33 institutions. The usual home economics requirements with special courses in art are cited in 5 replies, while 5 specify the home economics, art and professional courses deemed necessary.

10. *Necessary content in related science.* No careful consideration of the question of preparation of teachers of related science has been given at several institutions; 13 make the same requirements as for home economics teachers; 10 indicate their views by outlining courses; and several made vague answers.

11. *Modification of regular curricula.* No change in 11 instances; addition of either education, of education and child care, or of education and

practice cottage work to regular course in 9 instances. In 19 cases either no answer or a vague answer was made.

12. *Entrance requirements in vocational experience in home-making.* As a rule two years' experience as house daughter in 17 colleges; no requirement in 27 institutions; 5 unsatisfactory replies.

13. *Graduation requirements in vocational experience in home-making.* Two years of vocational experience as a house daughter or course in home management in 46 institutions; no requirement in 3 cases.

14. *Experience in home-making.* Provision is made for vocational experience in home-making in 47 colleges.

15. *Summer experience in home-making.* No requirement made by 33 colleges—it is recommended by 5—requirement is made by 9 institutions in case vocational experience has not been offered for entrance; 7 replies were vague.

16. *Commencement of professional studies.* In junior year, 28; sophomore year, 9; freshman year, 9; vague, 3.

#### PRACTICE TEACHING SUPERVISION

17. *Location of supervision of practice teaching.* Carried on in 47 institutions (24 in one, 12 in 2, 9 in 3 and 2 in 4 types of schools). In secondary or short courses at the college in 22 instances; schools at the college in 19 instances; in nearby high- or trade-schools in 17 instances; in local high schools with vocational departments in 15 instances; and in schools where students devote their entire time to assisting the regular teacher, i. e., apprentice teaching, in 8 instances.

#### TEACHER SUPERVISION

18. *Supervision of graduates actually at work as teachers.* No provision whatsoever in 24 cases; follow-up work done by a member of the staff in 17 cases, in 5 of which the member also acts in capacity of state supervisor; no answer or vague reply in 8 cases.

19. *The training of the teacher already in the service.* Summer classes, conferences, correspondence, bulletins, visitation, in 23 institutions; no arrangement made by 15; no answer made by 10.

#### EXPERIENCE, PLANS, NEEDS

20. *Relation to home-making needs of the State.* Most effectually through the extension service in 30 instances; through "cooperation"—means not stated—in 5 instances; through conferences, short courses, visitation to schools and women's clubs, etc., in 6 cases; no touch and no answer in 8 cases.

21. *Further development of course.* In 26 institutions plans were in hand looking toward change or further development. These included practice house work, practice teaching, follow-up work with graduates, training in related work, summer practice, child welfare, increased laboratory facilities, etc. No definite plans for further development were in mind in 13 cases; and no replies were received from 9 institutions.

22. *The most pressing needs.* New buildings, 9; better equipment, 9; increased appreciation of home needs, leading to closer relation of training to real problems, 8; more practice teaching, 11; increased facilities where-

with to give practical courses, 12; more and better trained teachers, 7; additional funds, 2; additional courses, 3; no answer, 8; miscellaneous, 6.

23. *Exclusion of students other than Smith-Hughes students from small Smith-Hughes classes.* Should be admitted, 42; should be excluded, 4.

24. *Principal benefits under Smith-Hughes Act.* Better and stronger courses and better organization of the work in 16 instances; recognition of its importance in 11 instances; no answer or indeterminate answer in 15 cases; miscellaneous, 7.

25. *Difficulties in meeting Smith-Hughes requirements.* None reported from 19 institutions; lack of properly trained instructors from 11; segregation of classes in 7 cases; practice house and practice teaching problems in 3; general problems of a small institution attempting to offer well rounded courses, in 3; no answer, 8.

Data secured by other means warrant the following general statements.

26. *Size of staff.* In 27 institutions, two or more, in 3 one member. No report from 19 colleges.

27. *Rank.* In 13 institutions one or more members hold professorial rank; in one, no member is thus designated. No report from 35 colleges.

28. *Names of courses subsidized from federal funds.* Methods, practice teaching, home management and technical work in 11 colleges; the same together with related art or science in 7; the same without technical work in 2; and professional courses, methods and practice teaching in 7. No satisfactory reports were received from 22 institutions.

The sub-committee feels that the more pressing administrative problems in vocational home economics teacher-training work are:

#### CONCLUSIONS REGARDING THE MOST PRESSING ADMINISTRATIVE PROBLEMS IN VOCATIONAL HOME ECONOMICS TEACHER-TRAINING WORK

1. The determination of the relationship of departments responsible for technical courses in home economics and the departments responsible for special methods courses.

2. Provision for home-making experience (outside of practice houses) and for some method of measurement for students in teacher-training courses.

3. Provision for practice teaching in vocational schools (those meeting the approved standard of the Federal Vocational Education Act).

4. Proper development of teacher-training work under restrictions imposed by certain state boards; e. g., apportionment of funds for teacher-training work.

5. Segregation of classes.

6. Expenditure of funds in teacher-training institutions.

#### THE SUB-COMMITTEE ON HOME ECONOMICS TEACHER-TRAINING RECOMMENDS

1. That certain definite standards (staff, equipment and curriculum) be established for teacher-training work in home economics in Land-Grant Colleges.

2. That definite standards and methods of measurement of home-making experience be determined for students who are to be recommended for vocational teachers.

3. That the administrative relationship be determined between the departments responsible for technical courses and the departments respon-

sible for special methods, as they affect the teacher-training courses to be studied.

#### REPORT OF SUB-COMMITTEE ON INSTRUCTION IN MECHANIC ARTS

In view of the fact that the sub-committee was unable to get together to formulate its report, the questionnaire system was resorted to, with results which may be stated concisely as follows:

##### TRAINING TEACHERS OF TRADE AND INDUSTRIAL SUBJECTS

1. Replies from 37 Land-Grant Colleges show that 25 out of that number have been designated by the State Vocational Educational Boards to train teachers of trade and industrial subjects under the Smith-Hughes Act.

2. Twenty-six land-grant institutions are expecting to undertake the preparation of related-subject teachers in trade and industrial classes.

3. In nine states institutions other than Land-Grant Colleges have been designated for the training of teachers in trades and industries. Of these, seven are in addition to the land-grant institutions. In four states colored institutions have been designated as well as the land-grant institutions.

4. In states where the work is to be carried on by other than land-grant institutions, the latter have no supervision over such work.

5. Of the 37 replies received, only seven institutions feel that the brighter college students will be interested in preparing themselves as teachers of trade and industrial subjects or as related-subject teachers; five think that only to a very limited extent will this work attract the better students; the great majority believe that the better class of college men will not be attracted to this work.

6. The department of education or of industrial education is in charge of the teacher-training work in most cases. In a few institutions this work is to be administered by the engineering divisions.

7. In the majority of institutions the department for conducting teacher-training work has been only recently organized.

8, 9, 10. The number of teachers in the department which has charge of this work varies from one to 15.

11. The replies as to necessary qualifications for a teacher of trade and industrial subjects indicate that preference is given to trade experience rather than to college training or to teaching experience.

12. The requirements for the teacher of related subjects are given, in most cases, as that equivalent to a college degree together with some trade experience.

13. Very few institutions seem to have provided any definite course of study for the preparation of teachers for trades and industrial subjects.

14. In some institutions the curriculum for the training of teachers differs from the mechanical engineering curriculum by the substitution of psychology and educational subjects for the specialized courses of the last two years. Most institutions expect in due time to formulate an entirely different curriculum.

15. The majority of institutions do not expect to require any vocational experience for entrance to the teacher-training course.

16. Graduation from high school or the equivalent of 16 entrance units are required for admission.

17. Some institutions require trade-experience during the summers while at college, but the majority have no fixed requirement in this respect.

18. No special provisions are made for the student to secure trade experience while at college. In one institution cooperative arrangements are being made with local industries.

19. In the majority of cases the professional studies begin in the junior year.

20. An average of about 20 semester hours is devoted to professional work.

21. The average semester hours required for graduation are 160.

22. About 160 semester hours are required for completing the teacher-training course.

23. The courses subsidized by Smith-Hughes funds or offset by them are stated to be: shop work, psychology, methods of teaching and related subjects.

24. The certification of students completing teacher-training courses done by State Boards for Vocational Education.

25, 26. Supervised teaching experience is required of all prospective teachers of trade and industrial subjects.

27. Model high schools, evening school classes and assistance, in teaching shop classes are methods used for conducting supervised teaching.

28. The minimum number of hours of supervised teaching varies from 17 to 36 per semester.

29. In the majority of cases an effort will be made to follow the work of students after they have left college.

30. Very few institutions have made definite plans looking toward the preparation as teachers of men who are now in the industries.

31, 32. Institutions find difficulty in securing teachers, the results thus far are not very positive and the progress is slow.

33, 34. Institutions are receiving good cooperation from industries in their localities in connection with the training of teachers.

35. The greatest needs seem to be men to train and a proper organization of training methods.

36. Institutions encounter no difficulties in meeting the requirements of the Smith-Hughes Act.

A. C. TRUE, *Chairman,*

J. F. DUGGAR,

T. F. HUNT,

G. A. WORKS,

EDNA N. WHITE,

AGNES E. HARRIS,

ANNA E. RICHARDSON,

W. M. RIGGS,

A. A. POTTER,

H. W. TYLER,

*Committee.*

On motion, a recess was taken until 9 A. M., Friday, November 14.

MORNING SESSION, FRIDAY, NOVEMBER 14, 1919

The Convention was called to order by the President at 9.30 A. M.

**THE PRESIDENT.** The report of the Committee on Experiment Station Organization and Policy will be presented by Dr. E. W. Allen, Chief of the Office of Experiment Stations, States Relations Service.

**E. W. ALLEN.** The Committee on Experiment Station Organization and Policy respectfully report as follows:

#### POSITION AND OUTLOOK OF THE EXPERIMENT STATIONS

This report relates to the present position and the prospect of agricultural investigation in the experiment stations.

During the period of the world war, when agriculture was playing such a vital part and the accumulated results of investigation were being drawn upon to an unprecedented extent, the state agencies for agricultural research remained practically at a standstill in their development, and in not a few cases lost ground. Investigation did not cease but it was interrupted and for the time being it stopped growing. Its efforts were in part diverted and it lost many of its workers, and when the war closed the changed economic conditions left it in a weaker condition and more in need of support than it has been for a decade. This is emphasized by the fact that in the past five years there has been no general increase in the appropriations for the stations from either federal or state sources. Here and there individual states have made some additions to the station funds either by direct or indirect allotments, but the aggregate has been small and taking the country as a whole the total has shown practically no increase. The preliminary figures for 1918-19 are almost exactly the same as those for the prewar year 1913-14, i. e., from the State and Federal Governments the appropriation in 1913-14 aggregated \$4,014,605, and for 1918-19, \$4,047,522.

There is probably no branch of the college which has felt the increasing cost of maintenance more than the experiment station. It is a large employer of labor, it is often required to buy considerable amounts of feed for its experimental animals, and its laboratory work calls for new apparatus and continuous replenishment of supplies, all of which have increased enormously in price. Salaries have advanced somewhat but not in proportion to the other expenses. It has repeatedly been said that the federal funds today have no greater purchasing power than the Hatch fund had at the time the Adams Act was passed in 1906.

It was inevitable, therefore, that agricultural investigation should be seriously crippled all along the line; but because the stations work in a quiet way and have made an effort to adapt themselves temporarily to the resources at their command the nation-wide extent of the setback has not been generally realized. The effects of a decline in station activity do not become apparent at once, and the situation has been further obscured by the extensive outgiving of information which is new to those who receive it.

The steady and unrestricted progress of investigation is so fundamental to college teaching and to the success of the great movements inaugurated for vocational instruction and agricultural extension that it has been felt desirable to lay bare the actual conditions the stations are confronted with and the outlook for their future. In order to do this faithfully and to

present a nation-wide view, the Committee canvassed the situation by means of a questionnaire sent to each station director which was replied to by all but one. A discussion of these replies constitutes the basis of this report.

#### GENERAL SITUATION

A large majority of the directors state frankly that in their opinion the experiment station is not progressing proportionately to the growth of other features in the College of Agriculture; in many cases college teaching and extension are believed to be advancing more rapidly. One director says that every means at command is being used to improve the grade and increase the quality of the scientific work, and another that the enlargement of research is regarded as over and away the greatest need of the college. But these cases are the exceptions rather than the rule. While there is a general feeling that the importance of research as represented by the station is recognized and the maintenance of its position forms an essential part of a progressive policy of the whole institution, at a considerable group the policy for the development of research is not reported as very evident or active, some characterizing the attitude as only moderate and others stating that it does not go so far as to work for state appropriations.

There is consensus of opinion that the stations have of late been retarded and limited in the range of their work; and in very many instances it has been necessary to suspend or restrict operations on investigations under way, or to omit taking up new ones for which there is demand. The extent to which this has proceeded is brought out in detail, showing a condition which is little short of alarming when the necessity for maintaining investigation on an active and efficient plane is considered. In all but ten stations, most of which have quite liberal state support, it is stated that numerous standing projects have had to be suspended or materially reduced in scope by cutting down the number of animals employed and in other ways, and that it has been entirely impossible to take up others of importance because of lack of funds or workers. In many cases lines of work are being sacrificed in order not to sacrifice quality. Even those stations which have not thus far been forced to discontinue existing projects elaborate upon the inability to do their duty by new problems. Several report that they are obliged to discourage all new work except that of a co-operative or emergency nature.

While the majority of the stations feel that they are progressing, at least within the limits of their budget, most of them realize that their recent progress or opportunity for development has been very limited and that consequently the outlook is far from being commensurate with the needs. Fully a third of the stations frankly declare that they are barely holding their own, marking time, or even losing ground in some respects. Fully four-fifths of the stations are emphatic in declaring that any expansion of research under existing conditions is impossible. The few who are optimistic on this point agree that the opportunity is far short of what it ought to be.

Although the stations feel that happily there is quite a keen interest in agricultural investigation and experiment on the part of the public, especially the stations' intelligent constituency, this interest is not as active as formerly and dependence is likely to be placed on the extension service which is close at hand and has won confidence in its ability to render help.



Farmers do not always distinguish between the getting and the giving out of information, and as their wants are being satisfied more largely than ever before, they have become less mindful of the source or the necessity of maintaining the supply.

There is a quite widespread opinion that the stations' concentration upon research with a less intimate contact with the public than formerly has had the effect of lessening the direct interest in their work on the part of the people in general, and diminishing the feeling of dependence upon them. A frequent expression is that the extension work has overshadowed the experimental work in the public mind; as one puts it, the spectacular and publicity features of agricultural extension tend to emphasize that service and to popularize it at the expense of agricultural research.

On the other hand, it is recognized that extension tends to give wider application to the results of investigation, to multiply the research efforts of the station, to increase the demands upon it, and ultimately to give it wider appreciation. For the time being, however, it is still necessary to emphasize the fundamental importance of research and secure wider appreciation of it. The further the stations get away from the immediate practical questions, as they necessarily must to solve the large and intricate problems of agriculture, the more need there becomes for support which is intelligent and sympathetic. This must begin, of course, with the institution itself and be embodied in a clear and forceful policy. As one director puts it, the development of the extension work due to the stimulus of the war and the supplementary appropriations will undoubtedly continue to focus the attention of the public upon that branch. "It is, therefore, absolutely imperative," in his opinion, "that the college administrative officials shall use every possible procedure to maintain a proper balance between the research work and these other lines."

Another factor in the general situation of the stations which seems to be steadily increasing is the restrictions thrown about their management, the selection and appointment of the staff, the salaries which may be paid, the ways in which funds may be used, etc. The form of the appropriations under the budget system, regulations surrounding the disbursement of funds, the application of civil service laws and rulings to the station personnel, and other measures have the effect of transferring the actual control of the station in no small measure from its originally constituted authorities to a body of state officers having little direct contact with the institutions or technical knowledge of their requirements. The purpose is largely defeated, and, what is even more serious, an institution which by all accepted principles of research should be as free and untrammled as possible, is bound down and harassed by technical regulations in a manner which seriously affects its efficiency and the most profitable use of its resources.

#### THE STATION STAFF

The matter of personnel will be recognized as a vital one in station work. In no line of effort is the personal equation a larger factor in success. Anything which disturbs the permanence or unfavorably affects the working conditions of the staff is promptly reflected in the general progress of the station.

A large majority of the stations report that they have suffered serious losses in their forces the last year or two, including many key men. One

station has lost seven department heads or leaders of separate lines of investigation; another six. From another 13 members of the scientific staff and foreman resigned during the year to accept better positions elsewhere. As a result "important lines must be abandoned." The appropriations for salaries at that station are statutory; hence increases can not be made to hold men who have better offers. This makes the station a training ground for the benefit of other institutions. Another station reports that it has lost some of its best men and finds it difficult or impossible to secure the kind desired because it can not pay sufficient salaries; and so on. Some few of the stations have been more fortunately situated, mainly among the larger institutions; but because of inability to prevent important changes and avoid frequent interruption of established investigations, a director of one of the leading stations regards this as likely to be more productive of trouble in the stations than changes in policy or resources.

The stations have found it exceedingly difficult to fill important vacancies. The competition for men has been unusually active among agricultural institutions and especially from commercial and industrial establishments. Few new persons of training are coming into the work; hence there is much swapping about. There is some loss from men going over into other branches of the college or extension work, where the chances for advancement are often better, but several directors testify to the preference of their men for research and the inability of other departments of the college to attract them away. The relatively large salaries offered by business concerns are hard to meet, and loss in that direction is noted by some as the most serious drain upon the station personnel.

The loss of leaders often involves the engaging of younger men with less training, which is a distinct setback to the progress of research. One director confesses that he does not know where to go to find men to replace some of those he has lost; another that in every instance where vacancies have had to be filled it has been necessary to increase salaries in so doing; and another believes that even if it were possible to offer increased salaries sufficient persons could not be obtained to meet the need.

One station announces that it will use every possible resource to maintain the continuity of its staff and "does not propose to lose its high grade research men due to pressure from commercial or other fields," but it apprehends that "unless college salaries can be raised in the very near future we will suffer more in this regard than we have in the past."

The inadequacy of the salary scale is almost universally recognized in the replies to the questionnaire. Some feel that station salaries are on a par with those of similar institutions, and generally with those of other departments of the college, but as some intimate the established scale of the college is too low and results in holding down the maximum which the station may offer. In the opinion of the large majority of directors, the salary scale of station workers does not adequately reflect the special qualifications and ability which are required for research. Several declare that the present salaries are no longer adequate for retaining men capable of carrying on high grade research or securing the best type of men. One remarks that "the entire salary scale is dangerously inadequate, and the future of research as well as of teaching is seriously threatened by existing conditions." Another feels that while the stations can hardly

expect to equal salaries in commercial enterprises "provision should be made as soon as possible to pay research men on a scale commensurate with the service rendered society." Others refer to the time which station workers must spend in advanced training and in securing experience in independent research, and one director declares that his station, with a maximum of \$3,600, is not paying more than 60 percent of what a fully trained, skilled, and efficient investigator should be able to look forward to.

A comparison of the salaries in the stations and the extension service presents some points of interest. The average salary of the extension directors last year was practically the same as that of the station directors. Department heads in the stations received from \$200 to \$300 less, on an average, than state extension agents and club leaders; while associate department heads in the stations received about \$200 less than assistant state agents and assistant club leaders, and over \$100 less than the average for extension specialists. The average salary for county agents was nearly \$2,000, while the average for assistants in the experiment station, leaving out those of the lower grades, was \$1,600. The entrance salary and the prospect of advance, are, therefore, more attractive in extension than in research, and the maximum to which workers may ultimately look forward is practically the same in the two lines.

Without making any comparisons as to the quality and importance of the service, it will be recognized that there is no department of the agricultural work which calls for as severe and extensive training as research. It stands at the pinnacle of the scientific activity of the college, and in its relation to the other features it is fundamental. It is too much to expect that men will be led to give years of intensive study in preparation for a field which offers less prospect of financial reward at the outset and no greater ultimate opportunities than other branches whose technical requirements are less exacting.

It is not surprising, then, to find the opinion almost universal among directors that far too few students are looking forward to and preparing themselves for a research career. A station director connected with one of the large universities where advanced study has been much encouraged, says that "very few of our bright young men go in for research," adding that practical agriculture is too attractive. Others say that the inducements for a research career are relatively less attractive than it was five years ago, and that while there are always some who prefer research above any other work and will persist regardless of inducements, the attractions in that field are growing less and less from the standpoint of young students. This is the general testimony of the station directors, and it gives rise to the feeling that severe as has been the loss from the station forces, the chief cause of alarm lies in the future.

The interest in research at the agricultural colleges is evidently not increasing but rather is on the decline as expressed by the attitude of their students. There are so many avenues open to graduates of these colleges at present that they are able to exercise considerable choice. Unless they have their attention directed to research and their interest in it is stimulated, unless they can see in that field at least an equal opportunity for advancement with that in other directions, they are not likely to be led into the long course of preparation it requires. On the other hand, unless the supply

of trained men can be adequately increased the effect will be a dwarfing one upon the experiment stations.

Until institutions frankly acknowledge the high quality of research, placing it at the pinnacle of scientific effort in agriculture, and express this in the salary that may be attained irrespective of the general scale, it is quite evident that the supply of persons trained for station work as a career will not be sufficient to allay constant apprehension for the future.

A considerable number of directors mention the necessity of dividing time with other departments of the college as a continued disadvantage to the station staff. It would seem that the inadvisability of requiring a skilled investigator to divide his time and attention with another engrossing branch of service had been quite fully demonstrated by experience, and that the inadequacy of relying upon persons heavily involved in teaching to do the station work at the present stage was beyond argument. If an investigator has teaching or other college duties his time is not his own and he can not control it for research. If he has more than a nominal college connection his duties are likely to be added to when pressure comes, as was the case this fall in many of the colleges with larger attendance. The chief argument for such dual service is expediency or necessity due to lack of funds. The leading members of the station staff need opportunity to concentrate their minds and their time upon their research problems, preferably few in number. A more general differentiation in force is a natural corollary to the differentiation of function which is now commonly accepted. Considerable progress has been made in this direction, but it is more important than ever before owing to the intensive nature of the investigation now called for.

The matter is well expressed by the director of one of the oldest stations, who says: "The crying need in all experiment stations, and especially in our own, is some change that will give the investigators time for uninterrupted study and thought and for concentration of effort on one or at least few problems. The demand for information is such that men are pulled from one thing to another and must do so many things that they have little time for constructive thought. I see no remedy for this except more men and money and complete segregation of the investigational staff." Another director of long experience explains that the station is embarrassed by the fact that most of its staff perform duties to the other two departments—teaching and extension, and advocates "nearly complete separation of the station from the college and extension staff."

Now that the demands from the public for general assistance, are being taken care of, it is rarely of any real advantage to a station to divide time with another branch. It increases its force and expands its range without increasing its real efficiency. The Committee suggests that stations might often be stronger as purely research institutions if they had a smaller number of persons on the staff, but these of high research ability and allowed to concentrate their best efforts on investigation. If the money used for salaries were put into a smaller number of positions these might be made financially more attractive to high grade investigators.

#### STATION FUNDS

The proportion of the total agricultural budget of the colleges which

is represented by the station funds for all purposes is reported to range from 10 to 48 percent, the average being 23 percent. That is, somewhat less than one-fourth of the agricultural budget of the colleges is available for station work of all kinds. In 60 percent of the institutions it is above this figure and in 40 percent it is below it. But this should not be understood to be all devoted to research and experiment. The funds for regulatory functions are included, as are also those used in carrying on farm operations frequently assigned to the station in which the experimental feature is quite limited or incidental. Although there may be some revenue from these operations, it is largely a revolving fund rather than an original source of maintenance for experimental inquiry. Since about one-third of the total revenues of the stations are derived from sales, fees, and miscellaneous sources, it is clear that the amount available for actual experimental work averages considerably less than one-fifth of the agricultural budget of the college. For a majority of the stations the proportion has either shown no increase or has declined in the past two or three years. Last year the States contributed approximately \$2,600,000, and the Federal Government \$1,440,000 for the use of the experiment stations. It appears, therefore, that in the aggregate the States are bearing a liberal proportion of the present financial support. One great difficulty, however, as far as the individual stations are concerned, is the inequality of the state appropriations. These are not proportioned to state size, agricultural importance or wealth, and not always to the size of the college. One State, which by its rank in rural population receives one of the largest contributions under the Agricultural Extension Act, provided for its station less than \$5,000 last year and failed to make any appropriation whatsoever at the last legislative session.

While nine states are contributing \$100,000 or more and eight others over \$50,000, 22 states are not meeting the federal appropriation by an equal amount, and 12 (or one quarter) are providing less than \$10,000. Six of these latter make no appropriation for station maintenance. Under these circumstances the struggle for existence is especially heavy on the less well supported stations, and the inequalities are in large measure responsible for the keen competition for men, making it increasingly difficult for those with meagre support to maintain a staff of high grade investigators.

#### NEEDS OF THE STATIONS

Increased financial support is the greatest present need of the stations in the judgment of those in charge of them. This follows from the description of their cramped financial position and the absence of any general increase in appropriation for a considerable period. The need is emphasized by the growth of other branches of the colleges, the increased extent to which the teachings of experiment and investigation are being applied, and the importance of keeping the system in balance.

It seems clear that if the stations are to maintain the position they have held in the past and provide the backbone of the whole system of agricultural education and advancement, they must receive larger financial support from some source. Their prosperity and welfare are the concern of every institution. Their advancement ought to form a definite part of every progressive policy of an agricultural college. The States will un-

doubtedly do something to relieve the situation when it is brought properly to their attention, and until some of the present inequalities are removed the States can not be said to be doing their full part.

While the cooperative principle is not expressly embodied in the Hatch Act to the extent of requiring each state to duplicate the federal appropriations, it may be said to be implied in the purpose and limitations of the act, and it has been a dominant feature of recent legislation such as that for agricultural extension and vocational education. The Committee believe that this spirit of cooperation should find more general expression in state appropriations.

The fact that only a little more than half the States are meeting the appropriations under the Hatch and Adams Acts suggests that responsibility for the present condition of the stations lies primarily with the States, and that the latter should first of all be looked to for relief. The stations are state and not federal institutions. They form an integral and essential part of a great system of institutions which is being developed in the States in which the latter assume large responsibilities. Every effort should be made to present this obligation of the States, and a larger provision of funds for the stations from that source ought now to be emphasized in the college budgets. In the plans for development of the agricultural work the research branch of the colleges deserves larger consideration and support than it has recently received at many institutions. Agricultural research needs to be emphasized and strengthened, lest the system get further out of balance.

If the federal appropriations were duplicated by the States the financial condition of half the stations would be very greatly improved. This done, as a stimulus to further state appropriations it is suggested that a new federal measure be sought which at maturity would provide for meeting state contributions dollar for dollar up to an added \$20,000, making the federal appropriation ultimately \$50,000 a year.

Meanwhile, your Committee strongly emphasizes the urgent necessity and the sound policy of rigidly conserving all the funds of the stations to their proper purpose and use. This is essential if the stations are to hold their own, to say nothing of developing. The stations have a distinct field and a fairly definite purpose. This should be recognized alike in their organization and the use of funds assigned to them. The station needs to exist and to be regarded as a definite entity, an organism developed and supported for a specific purpose, and with a force whose first and main purpose is the broadening of agricultural knowledge.

The present situation emphasizes the need of larger provision for recruiting the research forces of the stations. The call for experts in agricultural lines is becoming broader every year, and there are now so many attractive openings for young men trained in agricultural science that very few of them are available for station work. The same is true in other classes of educational institutions. If agriculture is to claim its share, the approach must be made attractive and the outlook encouraging.

The Committee is impressed with the importance of larger provision of scholarships or research fellowships for students desiring to prepare for agricultural research. These would afford an incentive and an opportunity which are now often closed to such students of promise, and would thus aid in building up the supply of men of rigid training and

broad vision, such as the stations require. More adequate salaries for subordinates, fully comparable with those in other lines of agricultural work, would strengthen the chances of retaining those who enter this field.

Beyond this, the Committee suggests the establishment in the colleges of a limited number of research professorships, to be open to investigators who have displayed marked ability and become entitled to special recognition. These would afford positions of both honor and emolument to which investigators might look forward, and would thus enlarge the possibilities to be attained in the field of agricultural investigation. Such positions would stimulate research as a career, and prove an added inducement to those of eminence to remain in that field rather than go over into administrative or commercial positions.

Respectfully submitted,

CHAS. E. THORNE,  
E. DAVENPORT,  
CHAS. D. WOODS,  
B. W. KILGORE,  
F. B. LINFIELD,  
E. W. ALLEN,

*Committee.*

On motion, the report of the Committee on Experiment Station Organization and Policy was received.

**THE PRESIDENT.** The Chair appoints as committee to nominate a list of officers for the new Section of Agriculture: Deans F. B. Mumford of Missouri, R. W. Thatcher of Minnesota and H. L. Russell of Wisconsin, and Directors W. H. Jordan of New York and G. I. Christie of Indiana.

The report of the Committee on Extension Organization and Policy will now be presented by the acting chairman, Director L. A. Clinton, of New Jersey.

**L. A. CLINTON.** The Committee on Extension Organization and Policy respectfully reports as follows:

#### REPORT OF COMMITTEE ON EXTENSION ORGANIZATION AND POLICY

Your Committee has not followed the usual custom of sending a letter to the extension directors asking for suggestions concerning problems it should consider, but, in lieu thereof, has acted upon suggestions furnished by its chairman, by the States Relations Service and by such extension directors as could be called into conference.

The following recommendations are submitted for your consideration.

#### 1. TRAVEL ON SMITH-LEVER FUNDS

Smith-Lever funds may legitimately be used for expenses outside the State:

(1) In attending conferences called jointly by the States Relations Service and the Committee on Extension Organization and Policy of this Association.

(2) In traveling to conferences with officials of the States Relations Service.

(3) In bringing in persons specifically to advise extension workers in conference on approved projects.

(4) When necessary and within reason, in bringing persons to the central office, or elsewhere, whose employment is under consideration; or in visiting such persons.

(5) No other expenses for travel outside the State may be legitimately incurred except those which will further in some definite way the work of a regularly approved project. Care should be exercised in incurring this class of expenditures. Not more than \$500 per annum should be thus expended without approval in advance by the States Relations Service.

(6) The expense of travel outside the State for commercial purposes, such as the purchase of livestock, seeds, etc., for individuals or groups of individuals, should be borne by those directly benefited and not charged against Smith-Lever funds.

## 2. CONFERENCES

(1) It is the sense of the Committee that all arrangements for conferences should be made with extension directors through the States Relations Service and not with project leaders.

(2) The Committee recommends that four group conferences be held during the present fiscal year, in the Southern, Eastern, Central and Far Western States; that to these conferences there be invited the state leaders in home demonstration work, county agent work, boys' and girls' club work, farm management demonstration work and such other groups as may be agreed upon by the Committee on Extension Organization and Policy and the States Relations Service.

## 3. PUBLICATION

In response to a query from the States Relations Service regarding publications, the Committee recommends that first consideration be given to publications dealing with methods, materials and organization, leaving subject-matter largely to the States and that the specialists of the States Relations Service be requested to summarize the work done in the various States under their several projects and to circularize this information among extension workers through the usual channels.

## 4. OUTSIDE AGENCIES

All extension work done with Smith-Lever funds is planned and agreed upon in advance by the several State Extension Services and the States Relations Service of the United States Department of Agriculture. It is recognized that there are or may be certain other agencies of a voluntary, business, semi-public or public character whose activities in whole or in part may closely supplement or parallel work outlined under certain projects of the extension services. In such cases it may occur that cooperation in those parts of the work that are closely similar or duplicating should be encouraged and it is suggested that under such circumstances the state forces and local forces should arrange conferences



with parties concerned when in the discretion of the extension director it seems advisable to do so.

It is recommended that the foregoing statement be adopted as a guide for the present and that during the coming year the Committee give special attention to this proposition.

#### 5. INTERSTATE CLUB WORK CONTESTS

It is suggested that boys' and girls' club workers should take part in interstate club work contests only in so far as this effort shall tend to further the interest of the club work under the approved project.

#### 6. EXTENSION WORK AND VOCATIONAL EDUCATION

In all agreements with vocational schools it should be understood that the extension services are administratively responsible for the initiation and development of the extension programs and that the extension work done by vocational people should harmonize with extension service plans and be administered by the extension service.

#### 7. TERMINOLOGY

It is suggested that use be made of the terms "Agricultural and home economics extension and demonstration" wherever possible and that the use of conflicting school terminology be avoided.

Respectfully submitted,

G. I. CHRISTIE,  
L. A. CLINTON,  
H. L. RUSSELL,  
THOS. BRADLEE,

*For the Committee.*

On motion, the report of the Committee on Extension Organization and Policy was received.

THE PRESIDENT. Is the Committee on Agricultural Terminology ready to report?

A. C. TRUE. For various reasons the Committee on Agricultural Terminology thus far has been unable to function. There seems too little interest in this matter to secure definite action on its part. I doubt the wisdom of its continuance as a standing committee and move that it be discontinued.

The motion, being duly seconded, was carried.

THE PRESIDENT. The Joint Committee on Publication of Research will now report by its chairman, Dr. H. P. Armsby of the Pennsylvania State College.

H. P. ARMSBY. The Joint Committee on Publication of Research respectfully reports for the period 1917-1919, as follows:

#### REPORT OF JOINT COMMITTEE ON PUBLICATION OF RESEARCH

As in previous years, the activities of the Committee on the Publication of Research have been confined to the editing, in conjunction with a similar

committee from the United States Department of Agriculture, of the *Journal of Agricultural Research*. No report having been submitted to the Convention of 1918, the present report covers the two years ending October 31, 1919.

During this time six full volumes of the *Journal* and parts of two others have been published, aggregating 3,831 pages and containing a total of 207 papers. Of these 207 papers, 106, aggregating 2,161 pages, were contributed by the experiment stations, and 101, aggregating 1,670 pages, by the United States Department of Agriculture. Papers have been published from 29 different experiment stations, as compared with 24 in 1916-17, the number of contributions from a single station ranging from one to 20. These figures show a slightly diminished activity on the part of the stations as a whole, but on the other hand a notable increase in the case of a few stations. As before, the contributions of the stations show a rather insignificant preponderance over those of the Department of Agriculture, both as to number of pages and numbers of papers contributed. On November, 1919, 19 approved station papers remained unpublished.

Beginning with April, 1919, the *Journal* was, by order of the Acting Secretary of Agriculture, reduced from a weekly to a monthly publication, with a maximum of 48 pages per issue, as a measure of economy in department printing. This action necessarily affected the promptness with which papers could be published and contributors were accordingly advised of the probable delay in the appearance of their papers. A few papers were withdrawn in consequence of this notice, but its effect has seemed most evident after the first two months in a slackening in the number of station manuscripts submitted, the monthly average for June to October, 1919, inclusive, being 2.6 as compared with 4.4 for the entire two years. This seems to indicate a tendency to seek other media of publication.

It appears most regrettable that it was necessary for the *Journal* to suffer such a sudden restriction in its activity at a time when it was apparently rendering an increasingly satisfactory service as a vehicle for the publication of the scientific work of the stations. It is hoped that the restriction will prove only temporary, although at best some time will probably be required to overcome the effects already manifest. Your Committee had agreed upon a recommendation that the Executive Committee of the Association be requested to take up the matter with the Honorable Secretary of Agriculture, and endeavor to secure, if possible, a return to the old basis of publication. Since coming to the Convention, however, it has been gratified to learn for the first time that such action has already been taken. It has also been informed, unofficially, that the Chairman of the Joint Committee has succeeded in obtaining some modification of the original restriction.

Respectfully submitted,

H. P. ARMSBY, Chairman.

On motion, the report of the Committee on Publication of Research was received.

**THE PRESIDENT.** The report of the Special Committee on Military Training appointed in accordance with a motion made on Wednesday

morning (page 37) will now be presented by its Chairman, President W. J. Kerr of the Oregon Agricultural College.

W. J. KERR. Your Committee, appointed to formulate the views and wishes of this Association with respect to the Reserve Officers Training Corps, respectfully submits the following statement.

#### REPORT OF SPECIAL COMMITTEE ON MILITARY TRAINING

The war has demonstrated the necessity for a new kind of military training which, in large measure, depends upon the work which is characteristic of the Land-Grant Colleges. This, taken in connection with the requirement of our institutions to give military instruction, places them in a peculiar and highly responsible relation to any plan for national defense. Whether animated by purely patriotic motives or a sense of obligation, the Land-Grant Colleges are now called upon to cooperate with the War Department, in reorganizing and greatly strengthening the training of reserve officers.

From the date of their foundation these institutions have given military training, the value of which was apparent in the recent war. Our desire now is to continue this training in full accord with recent developments and with increased efficiency. The cordial attitude of representatives of the War Department, their receptivity to suggestions, their evident desire to adopt every possible measure to make the Reserve Officers Training Corps a success, their recognition of the value of the work of our institutions in training thousands of officers, encourage us in the conviction that an opportunity is now afforded to place military instruction in our institutions upon a new and better basis which shall not only be greatly serviceable to our country but of lasting benefit to the institutions and their students.

Imbued with this spirit we desire to convey to the War Department an expression of our deep interest in its plans for making the Reserve Officers Training Corps one of the strong and important factors in the nation's military policy, and our desire to cooperate in its plans. Through its proper committee, this Association welcomes an opportunity to bring its views to the attention of the War Department and of Congress whenever, by so doing, it can assist to a better understanding of conditions or the enactment of wise legislation.

Specifically, this Association desires to express its views upon the following matters now under discussion, namely:

1. In order to insure the highest efficiency of instruction, the number of available officers for detail to the institutions having units of the Reserve Officers Training Corps should be largely increased.

2. In order to secure the greatest possible continuity and permanency in the organization of the Reserve Officers Training Corps units, officers assigned to a given institution should be allowed to complete the full four years' term of duty before being withdrawn.

3. Fully recognizing the importance of the summer camps as essential to the complete training of the Reserve Officers Training Corps, we are convinced that under present conditions voluntary enrollment in the advanced courses will be seriously limited by economic conditions which compel many of our students to seek lucrative and professional employ-

ment during the summer months. Large numbers of our best students cannot continue in their college courses unless they can utilize the summer months for earning money. In justice to them and to the aims of the Reserve Officers Training Corps, we believe that some means should be found reasonably to compensate these young men for the loss of earnings which must follow their attendance upon the required summer camps.

4.\* A commutation more nearly representing actual cost should be given for uniform and subsistence.

Your Committee begs further to recommend in accordance with suggestions made by representatives of the War Department that either by the Executive Committee or a special committee, this Association especially endeavors to cooperate with the War Department and with Congress in the enactment of any military legislation tending to affect our institutions.

Respectfully submitted,

R. A. PEARSON,  
A. D. CRILLE,  
W. E. STONE,  
W. J. KERR, Chairman.

On motion, the report of the Special Committee on Military Training was received and referred to the Executive Committee with the request that it communicate its recommendations to the Congressional Committee on Military Affairs.

THE PRESIDENT. The Memorial Committee will now report, by Dean Eugene Davenport, of Illinois.

MINUTE CONCERNING PRESIDENTS BROWN AYRES, C. R. VAN HISE AND  
J. L. SNYDER AND PROFESSOR C. G. HOPKINS

Since our last meeting, the Association has been called upon to mourn the loss of four of our most distinguished associates and yoke-followers in service. It will be remembered that at the last meeting the Association attempted to elect to its presidency Dr. Brown Ayres, of the University of Tennessee and desisted in its efforts only after his repeated and emphatic refusals to accept, due to the fact that it became evident that he was actuated by personal and private reasons. The fear that his health had become impaired proved true, for in a few weeks he laid down the work he had so long carried on with such eminent ability. He evidently had known that his time was short.

His personal life was one of peculiar charm and beauty. He was one of God's noblemen. He was always highly esteemed for his personal worth and acumen. His educational ideals were of the highest. His record was one of enthusiasm and intelligent fidelity.

President C. R. Van Hise of the University of Wisconsin had long rendered distinguished public service, not only as a scientist and an educator but also in connection with issues brought about by the war. His breadth of view concerning public questions made it inevitable that he should be called upon to assist in the solution of war-time problems. He had only recently returned from Europe, when his last official work was done. He

\*Inserted in report in accordance with vote of Executive Body (page 305).

had been attending and officiating at a Wisconsin conference in support of the principle of free lectures, a topic which he was discussing at the time with great clearness and vigor, when he was suddenly taken ill. A slight operation the following week resulted in his death.

Dr. J. L. Snyder, formerly President of the Michigan Agricultural College, and in 1908 president of this Association, was in excellent health and in full vigor until only a few weeks ago, when he was stricken with apoplexy. His long service at Michigan was rendered during the period of its greatest growth. He was untiring in his efforts to increase the enrollment. Upon retiring from the presidency, he had directed his attention to farming operations and he was extremely happy in his new relations.

When Greece called upon the Red Cross for relief, the Government made a special request for advice concerning the rehabilitation of the agriculture of the country. Dr. Cyril G. Hopkins of Illinois was invited and accepted the call to participate as one of the members in this service. He had finished his work, had been decorated by the King for distinguished service, and was on his way home, when he was suddenly stricken with sickness on board ship. He was put off at Gibraltar and died without regaining consciousness at the British Military Hospital on October 6.

Mindful of the high character and distinguished service of these public servants, and further mindful of the relations now broken, it is the thought of this committee that the Association now resolve that we express our high regard for the splendid service of these our former associates, that we deeply mourn their loss, that we extend our sympathy to the afflicted families, and that we commend the unselfish devotion to duty exhibited by these men as an inspiration for those who remain for further service.

EUGENE DAVENPORT,  
F. D. KEDZIE,  
H. A. MORGAN,  
Committee.

On motion, the report was adopted by a rising vote.

THE PRESIDENT. Mr. C. R. Titlow of the Federal Land Bank of Baltimore, Md., formerly director of the West Virginia Extension Service, will now address us:

#### THE FEDERAL SYSTEM OF FINANCING THE FARMER

BY C. R. TITLOW

The Federal Farm Loan Act, which was enacted by Congress in July 1916, has been of active service to farmers of this country for more than two years. Its principal purposes are to provide capitalization for agricultural development, to create standard forms of investment, based upon farm mortgages and to equalize rates of interest upon farm loans.

The law provides for the establishment of two systems, one commonly known as the Federal Land Bank System and the other as the Joint Stock Land Bank System. The former is a cooperative plan, whereby the farmers, who are borrowers, become the stockholders of the 12 banks established by the law. These stockholders receive, in the way of dividends, the profits made through the system. The latter is not a co-

operative plan, but through it permission is granted to a corporation formed of ten or more stockholders, to make farm loans for private gain.

Neither system is making government loans. In some sections of the country, those who are not in sympathy with any rural credit system have given considerable publicity to the idea that the Government has gone into the farm loan business; but nothing could be farther from the truth. The statement may have had its origin in the fact that in the beginning the Government was the chief subscriber to the capital stock of the 12 Federal Land Banks, and that the Federal Farm Loan Board, which has supervision of the entire system, is a part of the United States Treasury Department.

The initial capital of \$9,000,000 was practically subscribed by the Government. This stock has been increased to \$21,000,000, of which the national farm loan associations now hold more than \$13,000,000. The stock held by the Government has been reduced to \$8,200,000. The national farm loan associations will continue to reduce the stock held by the Government until the borrowers through these associations secure and control the entire stock of the 12 banks.

#### NATIONAL FARM LOAN ASSOCIATION

Before a farmer may receive the services of a Federal Land Bank, there must be organized in his district a national farm loan association. Each association must consist of at least ten farmers, who desire to borrow not less than an aggregate of \$20,000. None but farmers may borrow, and none but borrowers may become members.

The associations are formed along well recognized lines, each having a president, secretary-treasurer, board of directors and a loan committee. When the organization of an association is complete, a charter is granted by the Federal Farm Loan Board at Washington, upon the recommendation of a Federal Land Bank.

There are now in the United States 3,953 national farm loan associations, with a total membership of 100,412, all of whom have received loans. The total amount of these loans, as of September 30, 1919, was \$261,175,346. This is an average of \$2600 per borrower.

#### HOW FARMERS SECURE THESE LOANS

Any farmer whose farm is located in the territory included in the charter of a national farm loan association is privileged to apply for a loan on his land. This loan may not exceed 50 percent of the valuation of the land, plus 20 percent of the valuation of the permanent insurable improvements. After a farmer makes application to the secretary-treasurer of a national farm loan association for such a loan, his farm is viewed by the loan committee of the association, which consists of three members, who are also borrowers, and they make an estimate of the value of the farm for agricultural purposes. A federal appraiser is then sent by the Federal Land Bank to make a careful examination of the land, and fully to appraise the farm. The application, together with the appraiser's report, is presented to the executive committee of the board of directors of the Federal Land Bank. If the action of this committee is favorable, and the abstract of title shows that the farmer has a good title to the land, the

loan is granted, and in a very short time the farmer receives the money. These funds may be used to buy additional land, to pay off mortgages or liens on land previously purchased, to buy seed, feed, fertilizer, livestock, machinery, to make farm improvements, or for any purpose necessary for the general operation of the farm.

A survey made some months ago by the Federal Farm Loan Board shows that the loans granted were used for the following purposes: 8 percent to purchase land; 4 percent to purchase livestock; 60 percent to pay off existing mortgages; 10 percent to pay other debts; 13 percent to secure improvements and implements; 5 percent to purchase bank stock.

#### TERMS OF THE LOAN

The borrower pays to the Federal Land Bank \$32.50 semi-annually for each \$1,000 of the loan granted, or 6.5 percent of the amount of the loan, 5.5 percent of which is applied on interest and one percent on principal. Each payment reduces the amount applied on interest and increases the amount applied on principal. By this amortization plan, the entire mortgage is paid off in 34.5 years, although the mortgage may be paid off in whole or in part at any time after the first five years. Loans are granted in amounts of \$100 up to \$10,000. Joint Stock Land Banks may loan an amount exceeding \$10,000 and seldom make small loans.

For each \$1000 loaned to its members, the national farm loan association subscribes for one share of Federal Land Bank Stock, at five dollars per share. All profits accruing through the system are distributed among the stockholders in the way of dividends. Thus the farmer is not only a borrower but a stockholder as well, and as such eligible to receive a share of all profits in proportion to the amount of stock he holds. When his loan is paid off, the amount paid by the borrower for stock in the association is returned to him.

It is pleasing to note that of the \$12,500,000 installments that have accrued to the system, less than 1.5 percent are more than 60 days due and unpaid. The amortization payments are so small that it is not at all difficult for a farmer to pay them when due.

A few of the banks as yet have declared no dividends on the stock held by the associations, but as the volume of loans increases, like any large and successful loan corporation, they will be in a position to pay dividends that will be satisfactory to the stockholders.

#### FARM LOAN BONDS

In order that the Federal Land Banks may continue making farm loans, the Act provides for the assignment of farm mortgages to a trustee, called a registrar, for its issuance of bonds on mortgages so assigned. The sale of these bonds, which are known as farm loan bonds, enables the bank to make additional loans, which may in turn be pledged for bonds. This provides a continuous supply of funds to loan to farmers. The bonds have behind them full value in the way of farm mortgages, based upon 50 percent of the value of the land and 20 percent of the value of the permanent insured improvements, a reserve or guaranteed fund of 5 percent in the shape of capital stock, and the joint liability of all the Federal Land Banks. They are tax-free and are so attractive to in-

vestors, that recently bonds amounting to \$54,000,000 were sold in ten days by a bonding house syndicate.

The Farm Mortgage Bankers Association and a few individuals who apparently are not in sympathy with the agricultural interests of the country, are making a strong attack against the tax exemption feature of these bonds; but city real estate has for many years enjoyed the advantage of tax-free municipal bonds, and, also, the mutual savings and building and loan associations of the cities enjoy certain tax immunities. There are now outstanding in this country tax-free securities amounting to more than \$16,000,000,000, of which the city dwellers are the chief beneficiaries, to the extent of about 75 percent. Since farming is of vital interest to the Nation as a whole, there is no reason why the farmer should be compelled to pay a higher rate of interest through the taxation of farm loan bonds.

#### THE VALUE OF THE SYSTEM

This loan system has not been in service sufficiently long to determine its full value toward making farming more profitable, or helping tenants to become land owners. There are, however, examples to show that the system has enabled many farmers to carry out with greater facility the recommendations of the county agricultural agents, to purchase sufficient land for profitable farming units, to better equip and stock their farms, and to own for the first time the farms on which they are living.

In the South and West, where the rates of interest were as high as 10 and 12 percents, the system has established to a large degree a uniform rate of 5.5 percent on all farm mortgages. Perhaps the best thing it has accomplished for the farmer is that it has established a long time loan without renewals; that it has eliminated the danger of his being called upon when least prepared to liquidate his debt; and that it has given him a plan whereby he may reduce semi-annually the principal of his loan.

Under the Federal Farm Loan System, a farmer may work out a definite, fully financed, life-time farming system, which makes it possible for him to enjoy greater prosperity and happiness.

**THE PRESIDENT.** Will Dean Mumford report for the committee appointed to nominate officers for the new Section of Agriculture?

**F. B. MUMFORD.** The committee suggests the following list of officers: Chairman, Alfred Vivian of Ohio; vice-chairman, L. A. Clinton of New Jersey; secretary, C. G. Woodbury of Indiana. Experiment station sub-section: Chairman, A. R. Mann of New York; secretary, F. S. Harris of Utah. Extension sub-section: Chairman, B. W. Kilgore of North Carolina; secretary, H. J. Baker of Connecticut.

**THE PRESIDENT.** Reports from the nominating committees for the new Sections on Engineering and Home Economics are in order.

**W. M. RIGGS.** The Engineering Section has selected as chairman F. E. Tumeure of Wisconsin, and as secretary R. L. Sackett of Pennsylvania.

**ISABEL BEVIER** of Illinois. The Home Economics Section has selected as chairman Abby L. Marlatt of Wisconsin, and as secretary Mildred Weigley of Minnesota.



On motion, the nominations for the three Sections, as submitted, were approved and adopted.

**THE PRESIDENT.** The final report of the Executive Committee is now in order and will be made by the acting chairman, President R. A. Pearson of Iowa.

**R. A. PEARSON.** The Executive Committee greatly regrets that it can not be represented by its chairman who is still too ill to be present at this session. The recommendations about to be made have been determined in his presence and have his sanction.

#### REPORT OF THE EXECUTIVE COMMITTEE

The Executive Committee submits the following matters for consideration and action.

1. *1920 Convention.* It suggests that this be held at Springfield, Mass., at such time in October or November as may be determined upon by the incoming Executive Committee.

2. It suggests concerning the several recommendations made by the Committee on College Organization and Policy:

(a) *The need of substantial salary increases.* That this need is so obvious in most institutions represented in this Association that to say so by resolution seems unnecessary. However, the Committee would not oppose any resolution which might be offered.

(b) *The need of substantial salary increases in the Federal Department of Agriculture.* That the Secretary of Agriculture is alive to this need as evidenced by statements made in his address to this body.

(c) *The transfer of staff members from one institution to another, a matter for correspondence between institutional heads.* That it does not seem to the Committee an opportune time to lay down a rule of action in view of the abnormal situation now obtaining. The Executive Committee is in hearty sympathy with the general principle of comity between institutions in this respect and is of the opinion that the recommendations made by the Committee on College Organization and Policy (page 55) and by Dr. Jordan in his address (pages 80-82) are in accord with the best interests of the institutions comprised within the membership of this Association.

(d) *A bureau of education in the League of Nations; international and other educational conferences.* That action in these matters seems inexpedient.

(e) *An agency in the Federal Department of Agriculture to deal with problems relating to international cooperation in agricultural affairs including exchange of instructors and students.* That the latter matter is a recognized function of the American Council of Education in which body this Association holds membership; and that the former matter be referred to the incoming Executive Committee, in conjunction with the committee representing the Federal Department and this Association which is now attempting to bring into being some of the ideas broached by Dean Davenport in his Baltimore presidential address.

3. It suggests concerning the two recommendations of the Committee on Projects and Correlation of Research:

(a) *The uniform memorandum of understanding as a basis of all cooperative extension work of whatever nature.* That the "few cases where

misunderstandings have arisen" when "disregard of the fundamental memorandum of understanding" has occurred be referred to the incoming Executive Committee, which doubtless, as has been the case with its predecessors, will take up the matter with the Secretary of Agriculture with a view of securing adjustment.

(b) *A conference between the Executive Committee and the Secretary of Agriculture with a view of providing for the organization of an Agricultural Research Council, jointly representative of the Federal Department and the Colleges and Stations which shall seek to correlate and to cooperate and to conserve funds and energy.* That the incoming Executive Committee take up this matter with the Secretary of Agriculture with a view of determining possibilities and to scan its resources as to its ability to finance this proposition which implies the establishment of "permanent headquarters in Washington."

4. *Dues.* The Executive Committee recommends, in view of the approval of the two sections to which the proposition for increased dues for the ensuing year was referred (see pages 151 and 247), that the dues be fixed as indicated in its initial report (see pages 19-20) at \$75, \$55, \$35 and \$20 for the four types of institutions represented in our membership.

5. *Graduate School.* The Executive Committee recommends, in view of reports receive from the sections touching these activities (see pages 151 and 247), that the recommendation of the Committee on Graduate Study that the graduate school of agriculture be discontinued be approved and that no action be taken touching its recommendation as to the establishment of graduate fellowships.

6. The Executive Committee has been handed two sets of resolutions from the Section on Experiment Station Work, setting forth:

- (a) *The inadequacy of the funds now available for research work; and*
- (b) *The need of more effective promulgation of the results of such work.*

It is urged to take cognizance of the situation and to secure substantial increase of federal appropriation for research. It is further asked to represent to the Secretary of Agriculture the need of liberal allotment of funds for printing the results of research, with special reference to the Journal of Agricultural Research and the Experiment Station Record.

Concerning the first matter (the need of increased research funds), the Executive Committee clearly recognizes the situation and suggests that the incoming Executive Committee present the facts to Congress for such action as it may deem wise. It should be recognized, however, that the temper of Congress seems to be such that the likelihood of immediate success is not great.

Concerning the second matter (allotment of federal funds for publication of research), it is suggested that the matter be committed to the incoming Executive Committee.

7. *Supplementary Smith-Lever appropriation.* The Executive Committee has received a communication from the Committee on Extension Organization and Policy asking that it seek to secure the endorsement of the Association to a proposition to secure an increase of the supplementary Smith-Lever funds from \$1,500,000 to \$3,000,000 annually. The Committee recommends the same disposition of this request as in the case of the

suggestion from the Section on Experiment Station Work and it reiterates its doubt as to the likelihood of success.

8. The Executive Committee wishes to go on record in behalf of the Association in approval of the statesmanlike utterance of the Honorable Secretary of Agriculture before this body on Wednesday. It recommends that this Association urge the Secretary to publish and promptly to distribute this address as a federal document.

9. This Association desires to make public recognition of the efficient and patriotic services of President K. L. Butterfield as a member of the Army Educational Commission. This commission in cooperation first with the Young Men's Christian Association and, later, with the General Staff of the Army, developed a valuable and unique educational work among the American soldiers in France and Germany.

As the commissioner in charge of developing all lines of vocational work, including agriculture, engineering, business and the trades and industries, President Butterfield was peculiarly a representative of the type of education for which the Land-Grant Colleges stand.

This Association feels a just pride in President Butterfield's achievements abroad and takes this means of making record of its appreciation.

Respectfully submitted,

R. A. PEARSON, *Acting Chairman.*

On motions, successively made, each recommendation of the Executive Committee's report from 1 to 9 inclusive was accepted and adopted.

**THE PRESIDENT.** The following committee appointments for the next three years are announced:

The Committee on Instruction in Agriculture, Home Economics and Mechanic Arts: G. A. Works of New York, Anna E. Richardson of Washington, D. C., and F. E. Turneure of Wisconsin.

The Committee on Graduate Study: F. B. Mumford of Missouri and H. J. Webber of California; and for two years to fill vacancy, A. F. Woods of Indiana.

The Committee on College Organization and Policy: W. M. Jardine of Kansas and A. R. Hill of Missouri.

The Committee on Experiment Station Organization and Policy: F. B. Linfield of Montana and C. E. Thorne of Ohio.

The Committee on Extension Organization and Policy: G. I. Christie of Indiana and P. H. Rolfs of Florida; to fill vacancy for one year, Thomas Bradlee of Vermont; for one year on account of resignation of H. L. Russell, K. L. Hatch of Wisconsin.

The Committee on Projects and Correlation of Research: F. B. Mumford of Missouri; to fill vacancy for two years, A. R. Mann of New York.

The Committee on Publication of Research: R. L. Watts of Pennsylvania.

**THE PRESIDENT.** Is there miscellaneous business?

W. M. RIGGS. The Engineering Division makes two suggestions:

1. After careful consideration, it recommends that a compromise bill for the establishment of engineering experiment stations be adopted. This compromise bill contains several verbal changes from the draft presented

to the last Convention, including the very important change in principle that the legislature shall decide within a given state the institution to which the experiment station shall be attached. It is provided, however, that if in any state the Land-Grant College is equipped approximately as well as is some other institution, the experiment station shall be placed there. It is probable that in four or five states some doubt will arise as to the location, but that in all other instances the Land-Grant College will secure the station.

2. It suggests the appointment of a committee of three to coordinate the research which is now being carried in 12 or 13 state-supported engineering experiment stations, and suggests that a small fee be assessed upon the constituent institutions to cover the cost of operating this voluntary committee.

I move that these two matters be referred to the executive body.

The motion, being duly seconded, was carried.

W. E. STONE. This Association should not adjourn without recognizing the services rendered by President W. O. Thompson of Ohio and Director W. H. Jordan of New York, former presidents and long time members of the Executive Committee, both of whom are to retire during the coming year from active membership in this Association.

Furthermore, I am reminded that in our reorganization the Association has jettisoned the office of bibliographer, held during 24 years by Director A. C. True of the States Relations Service.

Consequently I move that a statement expressive of our appreciation of the services of our associates be prepared by the incoming Executive Committee and printed in the Proceedings.

The motion, being duly seconded, was adopted by a rising vote.

#### MINUTE CONCERNING PRESIDENT W. A. THOMPSON AND DIRECTORS W. H. JORDAN AND A. C. TRUE

The Association is deeply mindful of the loyal and effective work in its behalf of two of its members who of their own motion, during the coming year, are to sever their connection with the institutions they long have served. It seems especially fitting that we express thus formally our appreciation of their efforts during the many years that are past.

William Oxley Thompson, for more than twenty years President of Ohio State University, past President of this Association, member and for ten years Chairman of its Executive Committee, has been a potent force in shaping the policies and guiding the fortunes of this organization. Tactful yet outspoken, courteous yet forceful, with ready wit, and a firm grasp of the fundamental principles upon which the land-grant colleges and universities are based, he has shown himself fully the peer of the notable men who have preceded him in the important offices he has filled in this Association.

Whitman Howard Jordan, for thirty-five years an American experiment station director, former President, and for sixteen years member of the Executive Committee of this Association, was present in 1885 when this organization was born. Incisive of speech, careful and wise of judgment,

resourceful, always in earnest but never dogmatic, he has been for a generation a tower of strength in our councils as well as a friend whom those of us who have known him might grapple to their souls with hoops of steel.

The Association honors itself in thus attempting in these inadequate words to set forth its feeling touching these men. We trust that as visitors they may often be with us in future conventions.

Another member, for 24 years the official bibliographer of the Association will continue in our fellowship although the office which he has so well filled no longer exists. Dr. A. C. True, whose very name bespeaks the man, for a quarter of a century has prepared and presented bibliographies which have proved most helpful to many of our workers. We trust that the discontinuance of this line of work in our Association will not prevent him from issuing the results of similar studies under other auspices. We rejoice that while we lose the officer we keep the man.

W. H. JORDAN. I greatly appreciate this expression of good will. It is my purpose during the coming year to retire from active official work in an experiment station. However, in view of your action, may I not express my profound appreciation of the associations I have enjoyed for so many years. It has been a rare privilege that not many citizens of this country have enjoyed to meet with a body of men so earnest and so devoted to public welfare and the great purposes of education.

THE PRESIDENT. The action taken by this Association at this Convention in remodelling the Constitution should broaden the scope of our activities and further the interests of every College of Agriculture and Mechanic Arts in the land. There is a far greater field of work ahead of us than that we have thus far occupied, far more for us to do in the next third of a century than we have done during the past third. Let us push the land-grant college idea!

On motion, the Convention adjourned, *sine die*.

## MINUTES OF THE SECTIONS

### SECTION ON COLLEGE WORK AND ADMINISTRATION

WEDNESDAY AFTERNOON, NOVEMBER 12, 1919

In the absence of the chairman, former President E. C. Perisho of South Dakota, the Section was called to order by the secretary, President R. D. Hetzel of New Hampshire. President R. J. Aley of Maine was elected chairman.

On motion, it was voted to approve the recommendation of the Executive Committee providing for a new scale of dues (see page 19).

On motion, it was voted to approve the recommendation of the Committee on Graduate Study, touching the discontinuation of the Graduate School of Agriculture (see page 20).

On motion, it was voted to defer action for one year on the second recommendation of the Committee on Graduate Study as to graduate fellowships (see page 20) and to recommend that the matter be referred to the Executive Committee for further consideration touching methods for financing the same.

THE CHAIRMAN. The relation of the Land-Grant College to Americanization will now be discussed by President Howard Edwards of the Rhode Island State College.

#### AMERICANIZATION AND THE LAND-GRANT COLLEGES

BY HOWARD EDWARDS

Recently at a meeting composed mainly of representatives from the endowed colleges of New England, I heard a discussion on "The Teaching of Citizenship in the College." The ideas expressed by the representatives of these colleges seemed to me most unsatisfactory and depressing. A prominent official severely arraigned the training of students for citizenship as a goal for college effort, insisting that the ideal of college training should be the full development of the individual. This might not be so bad, since the full development of the individual might be held to include his development as a citizen. In any case, however, the emphasis is certainly wrong; for I hold that the social relations of man's existence are overwhelmingly the most important and indeed basal for every right and privilege that he can claim.

But that was not the most discouraging development at this meeting of New England college dignitaries. The statement was made and passed unchallenged, that citizenship cannot be taught, and that because of the lack of a philosophy of life. It was gravely and insistently maintained that in the New England college the old philosophy of life was no longer tenable, was no longer held and defended; that no one had yet arisen great enough and wise enough to provide a new and acceptable philosophy of life; and that without such philosophy no teaching of citizenship could be carried on.

If this represents the situation in time-honored New England colleges—I do not say that it does, but I do say that the prevailing tone of this

meeting on the subject of teaching citizenship was exceedingly depressing—if there are those in these colleges who can not see their way clear to deal with the subject of citizenship in a positive, sure-footed, aggressive fashion, at least for the Land-Grant Colleges there is no other course to pursue than to throw themselves wholeheartedly and unreservedly into the work of developing American citizens.

For the Land-Grant Colleges are based entirely and exclusively on the idea of social provision through governmental activity for social needs. The Nation needs and must have for its existence and progress capable citizens to serve its needs. The existing educational instrumentalities did not suffice or did not serve to provide the needed capable citizens. Hence the Nation and the State made provision for the further instrumentality which we call the Land-Grant College. It is its bounden duty, the only reason for its existence, therefore, to produce not merely capable, highly trained men and women, but also and in the same person loyal citizens, genuine Americans who know and understand both the duties and the privileges of American citizens, who love their Country with surpassing devotion, and who stand ready to make every sacrifice for the land that has made them what they are. The Land-Grant College cannot wait for the discovery of some ideal philosophy of life before doing the work for which it exists. It has its philosophy in devotion to human welfare, and it must exemplify that philosophy in the building up of citizenship or it has no basis for existence.

Americanization is the process of making men and women into American citizens. It is the process of establishing in the soul those ideals and principles of action which energize the genuine American. It is the inculcation of what we call Americanism.

It seems to me necessary at this point to consider what is Americanism in order that we may have a clear conception of that which is to be taught and may get some idea of the relation of the Land-Grant College to the task of Americanization. The central idea of Americanism, I think, is love—love especially of certain qualities, characteristics and achievements of our people, and I should classify these under four heads.

And first of all, Americanism means the love of America—her institutions, her traditions, her history. It may be that there are other lands as fair as ours, other countries as generous, other nations with traditions as noble; but the genuine American does not in his heart of hearts believe so. He loves America just as one loves his mother, and without disparaging others even in his own mind longs for her face as the fairest, her hands as the tenderest, her voice as the dearest in all the world. The human mind tends to center its emotions around something concrete. The Catholic in his devotions fixes his eyes on the image of the Virgin. The nobleman cherishes his pride of family by surrounding himself with the portraits of his ancestors. So the true American feeds his love of America by idealizing his community, his village, his city, the very landscape that surrounds him; by pilgrimages to Bunker Hill, to Yorktown, to Faneuil Hall, to Mount Vernon, to the tomb of Lincoln, of Grant, of Theodore Roosevelt. He rejoices in the stories of America's greatness of resource, of power, of achievement. He makes himself familiar with the lives of her great men, with the workings of her political organization, with her leadership in the march of human progress toward emancipation from the tyranny of fear and greed

and cruelty. Especially does he reverence the flag of our country, the glorious Stars and Stripes, as the emblem of the three great traditional principles of American self-government: Adherence to established orderly procedure in ascertaining the will of all the people; loyalty to the will of the majority as expressed at the ballot; obedience to law as formulated by that majority.

In the second place, Americanism means love of justice. The American is a fair-minded man and can always be appealed to on the basis of fairness and equity. He believes in justice not only to himself but also to other men. It is here that America's ideal of equality comes in. We say that "all men are created equal," and by the statement we mean, not equality of possessions, of powers of mind or body, or of freedom from misfortune or fate. Such an idea of equality would obviously be absurd. But the American idea of justice nevertheless involves a very real concept of equality into which all men are born. It means an equality of status under our institutions, an equality of duty toward the community and the State, and a consequent equality of privilege in the state. There is nothing more abhorrent to our conception of justice than what we call class-legislation—that kind of lawmaking which gives to certain men privileges that are denied to men of other classes, or lays burdens or restrictions on some from which others are free. The American sense of justice requires that laws be made for all men to obey whether they be high or low, rich or poor, employer or employee. We can no more tolerate wrong by capital toward labor than we can permit dominance on the part of labor over the helpless public.

And this idea of justice demands of us all equality in another respect. It calls equally upon all for the discharge of duty toward each other and the Commonwealth. It demands of each equally according to his ability that he give of his substance, his strength, and his mind to maintain and protect the ship of state and to keep her true to her course. It is surely unamerican to seek to enjoy the benefits that the State brings equally to all, or to try to filch from it special privileges, while at the same time striving to avoid one's share of the burdens proportionate to one's abilities.

Still further, the American idea of justice has insisted on equality of privilege limited only, just as is equality of duty, by personal powers. So far as human organization can assure it America insists upon equality of opportunity so that each may make of himself all that his powers will avail. She gives to each an equal basal share in the management of public affairs. She tolerates no exclusions on the basis of rank or class or creed. She seeks to give equality of equipment for the struggle of life so far as individual powers will permit; and she restrains those who would place unfair and discriminating obstacles in the road to success for all.

The third characteristic of Americanism is love of humanity. It is what the French meant by the word *fraternity* in their revolutionary trinity—"Liberty, equality, fraternity." In more modern times we have adopted for the idea the word "service." In a very real sense I think genuine Americanism involves a deep and earnest desire so to use one's peculiar or special powers as to serve mankind. The American people have frequently been represented as sordid dollar-hunters, moved only by self-interest and greed. As a matter of fact no nation so emotionally idealistic has ever existed. Time after time in America's glorious history, the Nation has



shown an altruistic readiness for sacrifice for an ideal so real and so great, that the world has been unable to understand and has grossly misinterpreted her actions and motives. The true American is by no means satisfied by personal success in business or profession. He must in some degree carry the burden of neighbors or community or state, he must make himself in some way avail for others, he must somewhere or somehow serve, in order to justify to himself his own existence.

And, finally, the fourth characteristic of Americanism is love of achievement. I am far from sure that others would include this factor as a primary one in an analysis of Americanism; yet it seems to me as vital as any that have been mentioned. The American loves initiative, action, vigor, effort and consequent accomplishment. The American is the man that does things. He is never in anything a passivist. The essential feature of nearly a century and a half of national life has been the astounding and abounding accomplishment that has transformed a few weak colonies and a handful of people into the foremost nation of the globe, and the distinctive characteristic of the American doughboy as compared with the soldier of Germany or France or England was his personal initiative and reckless daring.

I believe that Americanism includes as an essential part of it the gospel of work. Neither the lazy hobo nor the elegant social idler is a genuine American; for the American is the young giant rejoicing in his strength who goes forth to feed the nations, to girdle the earth with steel bands, to build queenly cities overnight, to sever continents and unite oceans, to conquer the air and serenely ride above the storm. Of every American you ask not what is his rank, but what does he do, and the man of no occupation is either ashamed of himself or is a suspicious character.

Such is the ideal which Americanization is the process of inculcating. The duty of the Land-Grant College is to impress this ideal on every student who passes within its walls.

And this it will do first by the American atmosphere and tone of all student and faculty life in the college itself. The religion of Americanism should govern and mould all contacts, all intercourse, all social and intellectual life, all the organization of work and discipline. The whole movement of college work should constitute a laboratory for teaching Americanism because these principles of Americanism should direct, govern and inform all college activities. And surely the courses in literature, history, economics, civics, sociology, philosophy and ethics offer direct channels through which the theory of Americanism can be and must be imparted.

I would even go much farther and say that the professional and vocational courses in our Land-Grant Colleges can be made and should be made the vehicle for effective training in Americanism. While the bridge engineer is learning the principles of bridge construction, he should certainly also learn his responsibilities to the community, his relations to the public welfare and development, the functions of the engineer as a leader of thought, and the economic bearing of his work on social organization and law-making.

There is one caution that is especially pertinent to this matter of Americanization work in Land-Grant Colleges, and that is that in our effort to make good technical workers the courses are apt to be overcrowded with technical subjects and tasks to the exclusion of subjects dealing with the relations of the worker to society. I believe this to be a fatal mistake.

In our effort to make capable men we should be exceedingly careful to lay equal emphasis on the making of citizens. The almost inevitable result of any other policy is to develop self-centered, individualistic workers concerned only for their own personal welfare, selfish and indifferent to their relations to society and community, a genuine menace rather than an asset to the Nation that has trained them. I repeat that the primary business of the Land-Grant College is to make American citizens.

I am quite aware that in all the foregoing I have taken no notice of the meaning of the term Americanization as at present applied to the training of adult foreign workers to be American citizens. I have done this for two reasons: In the first place, because I am convinced that the students of our Land-Grant Colleges, coming as they do from all strata of our population and in especial degree from our industrial and laboring population, need imperatively such work as I have emphasized. And in the second place, I have done this because to my mind the most important function of the college in Americanizing the foreign worker must lie in preparing leaders of the proper sort who coming in contact with foreigners in the industrial world in the course of their daily work, will have themselves such American ideals as will enable them both to take a helpful attitude toward the foreign workers and to lead intelligently in the work of Americanizing them.

**THE CHAIRMAN.** Presidents A. F. Woods of the Maryland State College of Agriculture and E. G. Peterson of the Agricultural College of Utah will now discuss the "Harmonizing of Investigational, Instructional and Extension Work in Agriculture."

#### HARMONIZING INVESTIGATIONAL, INSTRUCTIONAL AND EXTENSION WORK IN AGRICULTURE

BY A. F. WOODS

The Land-Grant Colleges are charged with three principal functions, education, research and extension. In most of the colleges the work on the central campus is the usual standard baccalaureate college work, supplemented by standard graduate work leading to the appropriate degrees. Many of these graduates in agriculture enter the federal or state service in professional or semi-professional work related to rural life affairs. Since the passage of the Smith-Lever and the Smith-Hughes Acts a considerable demand has been created for extension teachers, specialists, county agents, and teachers of agriculture, home economics, and trades and industry for high schools. It takes on the average from seven to ten years of college work and experience—assuming that we have the right material—to produce a competent teacher, investigator or county agent; and almost if not quite as much stress is laid upon the necessity of adequate practical experience as upon proper college training, if competency is secured. Much of the potential material is weeded out all along the line. It is impossible at the present time for the colleges to meet the demand for competent men and women in these professional lines.

Then there is a rapidly increasing demand for trained men in the agricultural industries, as managers and specialists of various kinds. The salaries paid are often much larger than are customary in college, school

and state work. A rapidly increasing number of graduates are entering industry on their own account. Thus there is being constantly developed an increasing inter-relation and interest between the colleges on the one side and the farms, homes, schools and industries on the other. These workers and leaders have great and difficult problems to solve. They must have the help of the college specialists. Libraries and laboratories must at all times be available. This touch with new problems keeps the work on the campus alive. It has an excellent and inspiring reaction on the students in training. It requires the closest cooperation of all subject-matter, as well as of administrative, departments.

I am asked to point out how this work can be most effectively organized. I desire to say at the outset that I do not think that it is possible even if it were desirable to devise a method of organization that would work equally well in all colleges. There is a tendency at the present time to lay too much stress on uniformity. This destroys initiative. There are, on the other hand, certain difficulties attending some types of organization that should be overcome or avoided. For example, a type of organization that permits the worker in any subject-matter department to get out of touch with each other, leading to lack of cooperation and to duplication, is destructive of morale, both within and without institutional walls. It wastes energy and money and accomplishes little. This danger appears to be greatest where the local teaching, extension and research functions are most distinctly separated, the subject-matter men being responsible only to their respective directors or deans. In such a type of organization, opportunity for frequent conference and cooperative formulation of projects should be provided and the administrative officers should be active in preventing unnecessary duplication and in securing cooperation.

In most cases better results will be secured by a unification of the three subject-matter groups into a cooperating unit or department, efficiently organized, manned and equipped to give the very best service to each branch of the institution needing it, dealing with the director of education in the conduct of local educational work, the director of extension for extension work, and the director of research for the work of the experiment station. The routine business of the subject-matter department should be handled largely by an executive clerk under the direction of the head of the department or chairman of the group. The teachers, investigators and specialists are thus relieved of most of the work incident to administration and to routine affairs and can devote themselves to their own specific tasks. They have their budget assignments and know as nearly as possible what to plan for. The time of some may be wholly given to one phase of the work; in other cases the time may be divided. It is essential that definite assignments be made in accord with the approved projects so that each director may proceed with his work with an assurance of noninterference and with the certainty that his plans will be carried out. Such an organization is more effective in meeting emergencies than is the separate group system.

Briefly the general plan of organization would be

The President,	The Director of Education,
The Director of Extension,	The Director of Research.

In the educational group the divisions or schools would be presided over by deans, who, under the chairmanship of the director of educa-

tion, would organize the curricula and supervise the teaching, making proper provision, of course, in the various subject-matter departments, e. g.: Farm crops, soils, horticulture, farm organization and management, economics and marketing, plant pathology, plant physiology, general systematic botany, bacteriology, chemistry, forestry, dairy husbandry, animal husbandry, language and literature, history, mathematics, etc.

The danger in this type of organization is that a worker's energies may be too greatly divided. This must be carefully avoided. Each man must have his major line of activity clearly defined, while his minor lines should be so arranged as to help rather than hinder the prosecution of his major project.

#### HARMONIZING INSTRUCTIONAL, EXPERIMENTAL AND EXTENSION WORK IN AGRICULTURE

BY E. G. PETERSON

It is not presumed that the limits of this paper should include a discussion of the relations within the separate major divisions of work in interior instruction, research and extension. Relationship between the major divisions is rather the limit of the paper. It may be expected that a large number of questions will constantly arise within a particular division relating to the work of that division. The horticulturist and the botanist may duplicate each other's work. The agronomist may encroach upon the field of the physicist. Many of the departments may engage in breeding work when this work might well be limited to one department. The same situation holds with extension work. The seriousness of the problems will depend upon the wisdom of the station and division directors. It is obvious that there must be a smooth working organization within the separate divisions before there can be harmonious relations between the divisions. It need only be said that properly working major divisions which are built in turn upon properly working departments are a fundamental necessity.

#### THE NECESSITY OF UNITY

The college program in agriculture is essentially three phased: (1) research, (2) interior instruction, and (3) extension. These three, however, constitute one attack upon the problems of rural civilization. They constitute a unit, not only from the standpoint of industrial and economic necessity but, furthermore, represent a practically ideal pedagogic arrangement.

No teaching is more spiritless than that which does not have access to original sources. So far from the head waters, it comes soon to a condition of stagnation. There is no constant replenishment of the water from fresh sources. Not only must a stream be fed from fresh sources in order to keep it clean, but it must also be drained. What finer outlet exists than that provided by the extension division. Practically 99 percent of our population do not have access to our colleges as regular students. This 99 percent represents a population which may be touched in one way or another educationally by the extension division. This supplies a stimulating opportunity which is very valuable, not only to him who receives but also to him who gives. So there is constantly the fact staring the college worker in the

face that every unit of his potential ability may be made kinetic. His work is motivated. Therein lies one of the greatest weaknesses in many institutions which did not possess the stimulus to research and extension enjoyed by our institutions. The purely academic ingrows and destroys itself. There is a good suggestion wrapped up in the statement that knowledge when it has passed its period of greatest usefulness is respectfully entombed in books. Having access only to this spent knowledge institutions having no access to new truth constantly tend to suffer.

#### THE DEPARTMENT OF INSTRUCTION

The head of an instructional department should be in charge of the subject-matter of his department in all its relations, interior instruction, research and extension. He should be definitely responsible for the delegation of members of his department or the appointment of others to work covered by his department. There might appropriately be in, say, the department of agronomy, an arrangement as follows: The head of the department might be the station agronomist. A professor or assistant professor might be in direct charge, under the head, of course, of the interior teaching and another professor or assistant professor might be working exclusively in the extension division. Through periodic and preferably frequent departmental meetings, perfect harmony could be maintained. And so with all other departments.

#### IN ADMINISTRATIVE WORK

It is less easy, of course, but nevertheless entirely possible, to work such semi-administrative forces as the county agents and other related extension workers into the academic fabric. A county agent is in part an administrative officer and is forced to deal with a wide variety of subject-matter. He is in the front line trench and can not in his intimate contact with his problems preserve those nice distinctions which are so easy to make and to observe when you are farther away from the front. He must be given considerable freedom in his work. Criticism by interior teachers or experiment station workers should constantly keep in mind the fact that the county agent is dealing with that most powerful of forces—public sentiment—and is not shielded by academic or geographic barriers. He must deliver the goods on the spot. That he makes mistakes is an indication that he is aggressive. Educational disdain for him and his work should not be as common as it is. He represents possibly the most powerful single educational movement in America today. To do his best and to enable him to assume his proper relationship to all departments of the college, the greatness of his mission must be recognized and he should know in what esteem he is held. All county agents and home demonstrators might well be given academic rank and the same is true of club leaders and home demonstration leaders. This method is in force in certain institutions. The organization of the county agent's work, of course, should recognize the departmental organization of the college. He should be in frequent touch with the departments of the college in regard to the subject-matter information constantly necessary in his work. Correspondence, for example, relating to animal husbandry and which involves points on which the county agent needs help, should directly or indirectly find its way to the

head or some other recognized members of the department of animal husbandry; and similarly with agronomy, soils, irrigation, drainage, etc. The same policy should attach to all such extension workers including junior extension workers and home demonstrators. The administrative responsibility, of course, must be centered in the extension director's office.

#### TRANSFER OF WORKERS

In the development of the work of the college, it becomes frequently apparent that somebody is stagnating in interior teaching, experimentation or extension. The best move in such a case is a leave of absence for further study or travel. If this is not practicable, a transfer from, say, extension work to interior instruction, is often desirable. And aside from the curative feature of such a policy of transfer, the policy is a good one to accomplish other purposes. It tends to harmonize the different divisions and prevents a hardening of the divisions into undesirable systems of thought and action. The college to be strong and serviceable must be kept fluid. The condition of growth which is the essential factor in the life of the majority of the Land-Grant Colleges in the consideration of any problem affecting them makes undesirable a hard inflexible organization or over-systematization either in personnel or in method. A rapidly moving automobile had better have a little play in its steering gear unless it wishes to hit every rock in the road and go over them instead of sliding around them. Too much play, of course, is worse than none at all. Exchanges from division to division help to keep the mass fluid and workable, adaptable to the new conditions which now especially confront us constantly. And efficiency is inversely proportional to rigor of organization, up to a certain point; but only up to a certain point, beyond which the reverse is often true. The size of an institution often necessitates rigorous organization which tends to prevent the adaptability which smaller institutions enjoy with a corresponding greater efficiency. Of course certain people are valuable only in one capacity. They may be superior in research and relatively valueless in extension work or interior teaching. Such should, of course, be undisturbed. The genius comes in this class and it is sound policy to give him great freedom in his work. But in many cases transfer is possible and desirable.

#### UNIFORM CONTRACT

An element of safety in this regard lies in the uniform salary contract, if such is practicable, for as many of the workers as possible, covering 12 months. This applies to interior teachers, experiment station and extension workers. The quarter system, which now prevails in many institutions, makes this easier. Until the summer quarter grows to the size of the other quarters, if it ever does, many of the teachers would be available during the summer for committee work such as publicity, editing, teachers' institutes, exhibits and displays, agricultural extension activity, research either in connection with the experiment station or otherwise, and supervision in construction. Of course, many members of the faculty are not adapted to such work and would hinder its proper operation. There is very much to be said in favor of the 12 months' contract. It obviously would not be wise to make it so inelastic that it would prevent summer study and recreation. But one of the defects in the academic world is the

separation in many ways of that world from the practical world of affairs outside the halls of learning. Few, if any, industrial concerns allow a three months' vacation every year. It would be doubtful wisdom even for their best workers. A very successful cotton operator in the South, trained in one of the largest universities of the Middle West, told me recently that it took him years to overcome the handicap of his university training. To be sure he was extreme in his view and probably owed the very success which he has attained to the mental power which he had acquired in college. He doubtless based his statement upon the fact that a large proportion of the technical information he acquired while in the university was comparatively valueless as such. But his remark illustrated an opinion frequently held by men of influence.

There would be many advantages if the college could present this year-round busy aspect and have work for many instead of for comparatively few on the salary list during the entire year, allowing, of course, liberally through the sabbatical privilege and otherwise for recreation and further study. The people would be better satisfied if the teachers they employ worked in somewhat the same fashion as the rest of the people work. And it would destroy that separateness which now exists in contract between the extension and experiment station workers on one side and the interior teachers on the other. It obviously would involve careful planning and organization on the part of the president or dean, and would imply a flexibility of mind and a temperament on the part of the faculty which probably does not always exist. To have a faculty imbued with the attitude of working folk, using that phrase in its most dignified sense, is a blessing to any college.

#### DISTINCTIVE QUALITY IN RESEARCH AND IN EXTENSION

The experiment station unless very carefully directed is liable to fall into the way of confusing demonstration with research. The public clamor is for demonstrations, for quick results. Sensational methods and announcements are often very tempting, especially in view of the general lack of appreciation of a broadly planned, deeply laid research project. And yet the ultimate welfare of the Agricultural Colleges and of agricultural science as such depends upon the success of experiment station directors in getting their workers deep down into the structure of knowledge.

A demonstration of how to control a certain noxious weed by the application of a certain chemical, or through practice of a certain cultivation method, would popularize the demonstrator but it might well be done by the extension division. The station botanist or horticulturist should deal with such problems as plant breeding, accurate and systematic surveys, the location and identification of diseases of plants and of noxious weeds over areas, the complete investigation of chemical treatments for certain weeds. The station agronomist, for instance, in dealing with alkali, should make his work cover the question of alkali in a comprehensive way. What are the important alkalis, what are their properties alone and together? Under what conditions of temperature, and under what various physical and chemical soil conditions do they work harmfully and how can this damage be measured and counteracted, if at all possible? A demonstration of the effect of drainage upon alkali or water-logged land is more properly an extension project. Here established knowledge is being applied locally.

In the experiment station project, new truth is being discovered, or old truth correlated or systematized.

There should be a clear-cut distinction between research and extension methods in order to avoid confusion. One is as important as the other. There is no need to differentiate as regards value between the two. There is no more inspiring human being than an extension worker who has that peculiar genius which characterizes the really powerful extension leader. And the very highest scholarship should find exemplification in our experiment stations. There are too few Babcocks who can go to the very roots of knowledge and make an application now and then which will transform an industry.

#### CONFERENCE

No administrative arrangement is complete unless it involves constant conference by those interested in the work. Some one once asked a noted Catholic prelate what the secret was of the success of that remarkable organization which has outlived nations. The answer was, "Conference, conference, conference." Definiteness of policy is quite necessary in college organization. Workers must not be left to imagine what the plans are, or to guess what is in the mind of the president, dean or director. They should know and if possible at first hand. Vagueness or indecision is suicide. There need not be, of course, blustering autocratic methods but rather carefully discriminating decision on all important points. Constant and systematic conference provides the best opportunity for such discriminating decision. At such meetings, say weekly, those in charge of the major divisions of work should report on their work including as far as possible methods, new work, results, conflicts and readjustments. Such discussions not only tend to prevent misunderstandings and to reveal illogical and unwise situations and developments, but they produce positive understanding, sympathy and cordiality.

#### THE PERSONAL EQUATION

After all, everything turns upon the innate willingness of the workers and especially the leaders themselves. Some people are naturally co-operators. You do not need anything in their harness except the tugs. And there are even those who if they can not pull will push. You do not need much of an organization for such people. But, unfortunately, such great Christian spirits are too rare and the organization must be built for the others. But even granting what has just been said, the greatest strength or weakness in a college is in the human quality of the human beings who are there; and the definite disposition and internal desire to cooperate must be there in part, at least; otherwise any plan will fail.

Not the least important factor in this regard, it may be stated, is the responsibility of the employing agency to select the right kind of workers. At least half of the work of a college president or dean is done, or at least half of his difficulties eliminated, if he has selected capable and adaptable workers for the various departments or divisions. It appears to be unfortunately true that as our education systematizes itself we demand more and more a special training rather than a special person for our various appointments. We are getting, it must be admitted, somewhat machine like. If a man is trained under Warren's direction we accept him some-



times without regard to other important things, when obviously Warren can only be responsible for his information on farm management. So it is true of Hopkins in soils, Eckles in dairy husbandry, Curtiss in animal husbandry, Ely in economics, Armsby in nutrition, and many others who could be mentioned who have assumed a position of authority. We may secure in our appointee an abundance of information on a special subject, but poor adaptability to local conditions, questionable administrative ability and inferior human qualities. Ability to cooperate and ability to get along with people do not always go with scholarship.

In the time allotted for this discussion it would not be appropriate to go into great detail. The points which have been mentioned are considered important considerations looking toward a harmonizing of the work in agriculture as it is related to interior instruction, experimentation and extension.

On motion, the Section adjourned *sine die*.

## ENGINEERING DIVISION OF THE SECTION ON COLLEGE WORK AND ADMINISTRATION

WEDNESDAY AFTERNOON, NOVEMBER 12, 1919

The Division was called to order by the chairman, President W. M. Riggs of South Carolina.

On motion, a nominating committee, consisting of Deans A. Marston of Iowa, G. W. Bissell of Michigan, and E. F. Coddington of Ohio, was appointed.

**THE CHAIRMAN.** An opening address from the Chair is the most unimportant item on a program—a sort of extension of the fad of speech-making at a banquet when everyone in attendance is already full. When it is begun, the hope in every heart is that it may be brief; when it is over it is promptly forgotten and the real business of the program begins.

Therefore, I shall content myself by taking three minutes to set forth a question, the debate of which might require as many hours. It is suggested by some educational experiences with the American Expeditionary Forces in France, where conditions made necessary a different approach to many of our educational problems from that obtaining on this side.

In this day of the insistent cry for industrial democracy, I raise the question of an educational democracy as well—a democracy in which the people would have a real voice in the educational affairs of the State and Nation. At present what real representation have the people in college education? What part, for instance, in fixing standards, in determining the courses to be given, in indicating the lines of service in which the college can be most useful to the people? If “taxation without representation” is tyranny, then I affirm that college education is a remaining form of tyranny. The people are called upon to furnish the sinews of war, but the opportunity or privilege to initiate or suggest educational policies has never been regarded as a public prerogative to be exercised generally, or even indirectly, through representative channels.

What part, if any, shall we seek to give the public—which pays the bills—in our educational program? What opportunity to help us with our task? How shall we keep our finger on the pulse of the public in order that we may note a rise of temperature indicating a need for service? In a great industrial nation such as ours, shall we not lose if we fail promptly to sense the popular need, and may we not in a measure fail in our task because as colleges we do not live close enough to our people and neglect to give them an organized opportunity to voice their educational needs and aspirations?

Thirty years ago, Bill Nye, that old philosopher of the North Carolina mountains, gave us his definition of a republic—“A country run by men who made that their business.” I wonder if the same definition as applied to education would account for its slow beginnings by the process of crystallization around the dust particles of antiquated theories and ancient needs! I wonder if, perchance, the people had undertaken to dictate what should be taught, leaving only the “how” to the professional educators, whether our steps along the educational highway to the goal of the people’s greatest need would have been so faltering and so slow!

In short, I wonder if through deference to teachers, as such, on the one

hand and indifference to educational matters in general, on the other, the people have not left too largely the whole matter of education in the hands of those men and women "who make that their business."

The Division will now take up the discussion of proposed engineering experiment station legislation.

#### ENGINEERING EXPERIMENT STATION LEGISLATION

W. E. STONE. The Morrill Act and the Nelson Amendment of 1907 appropriated federal monies to the State to be allocated to certain institutions as designated by the legislature. Other federal appropriations to branches of these institutions, namely, those provided by the Hatch and Adams Acts, are "paid to the treasurer or other officer duly appointed by the governing board," as is specifically indicated in each enactment. That is to say, these monies are appropriated not to the State but to the institution. The language is identical in each of these federal enactments. It is the contention of the institutions represented in this Association that any and all federal appropriations in the interests of any branch thereof, whether now provided for or made in the future, should follow along the line of this established practice.

THE CHAIRMAN. At an informal meeting in Baltimore, Md., which was held in connection with the Convention of the Society for the Promotion of Engineering Education, a special committee was appointed to further the interests of federal legislation in behalf of engineering experiment stations. It was planned to meet with several prominent advocates of the Smith bill and to seek to arrive at some mutually satisfactory compromise. This joint meeting did not materialize. However, the committee requested me to visit Atlanta and to confer with President Matheson of the Georgia School of Technology and with Mr. Phineas Stephens of New York, both strong advocates of the Smith bill, and, if possible, to formulate a compromise measure to be submitted to this Convention. I accomplished this mission. The substance of the compromise is contained in a modified form of the bill.

The principal changes are located in Sections 5 and 6. Section 5, as modified reads, in part, as follows:

"That the State Legislature of each State is hereby authorized to designate and appoint that institution of its respective State which is best equipped and organized to conduct the work under this Act; provided, however, that in a State having at a Land-Grant College facilities for conducting the work provided for by this Act approximately equal to those of other institutions in that State, the Land-Grant College shall be designated as the location of the proposed Station."

Section 6 is modified to limit the amount of detailed supervision which might be exercised by the Secretary of Commerce.

I urge the adoption of the compromise. In my judgment it will be impossible to pass the bill this Association prefers because of the opposition of Senator Smith and of a small body of his senatorial associates who are prominent in educational matters. I recognize the old argument that to make concessions at one point might lead to a division of other funds. In my judgment it has little weight because I do not believe that

it is likely that the Land-Grant Colleges as a class will be favored in the future by Congress. I believe that the adoption of this compromise will result in the location of the Stations at the Land-Grant Colleges in all but four or five States.

P. S. STEPHENS of New York. The Smith bill is of great importance to the Land-Grant Colleges since all the land-grant institutions, with two or three exceptions will doubtless be the recipients of the funds.

K. G. MATHESON of Georgia. The supporters of the Smith bill have met the land-grant institutions more than half way. I believe that the Smith bill had a good chance of passage after the Peace Treaty had been settled.

THE CHAIRMAN. The discussion will be continued by Deans Marston of Iowa and Boardman of Maine.

#### THE FUTURE OF ENGINEERING EXPERIMENT STATIONS AT LAND-GRANT COLLEGES

BY ANSON MARSTON

The writer will discuss this topic under three heads: The present situation; the status of national legislation for engineering experiment stations; a proposed plan.

##### PRESENT ENGINEERING EXPERIMENT STATIONS AT LAND-GRANT COLLEGES

The present situation is as follows:

1. Engineering experiment stations have been organized, on paper at least, at a considerable number of Land-Grant Colleges.
2. A large proportion of these stations have regular funds allotted to them from college income and are in a position to do systematic research work, though in several cases their resources are quite limited.
3. Some of the stations enjoy annual incomes of \$35,000 or more, devoted exclusively to research work, have developed permanent research staffs and are in a good position to continue their activities with a reasonable hope of receiving increased incomes from state sources.
4. The present stations at Land-Grant Colleges have no national organization and there is no attempt at systematic coordination of their work with a view to directing it to national as well as state needs and to avoiding unnecessary duplication.

##### THE STATUS OF NATIONAL LEGISLATION FOR ENGINEERING EXPERIMENT STATIONS

The writer cannot help feeling that the present status of the efforts to secure national legislation for engineering experiment stations at Land-Grant Colleges is very discouraging. The McKinley bill, introduced about 15 years ago, was killed because of the jealousy of the separate State Universities. The Newlands bill, introduced in behalf of the Land-Grant Colleges shortly before the war, practically was killed in the same way. The Smith-Howard bill has not proven satisfactory to the Land-Grant Colleges, and apparently has no chance to pass without their support.

The present Land-Grant College bill has neither been accepted by the Smith bill supporters nor introduced into Congress. The writer doubts

whether more than a handful of congressmen know of its existence. And the National Research Council has not proven very enthusiastic in its support.

The writer believes it to be vitally important that the supporters of the Smith bill and of the land-grant college bill get together and unite their efforts. Thus far, we have met annually, discussed the subject, passed resolutions and gone home to rest on our oars until the next convention. The subject has been kept alive in our own minds but little progress has been made in Congress.

The writer believes that we urgently need a permanent organization in Washington to coordinate our engineering experiment station work at the Land-Grant Colleges in respect to national as well as state programs, to establish official relations with the various federal departments and with the National Research Council, to secure legislation and otherwise to promote the interests of the stations, with a paid secretary devoting all or a considerable part of his time to the work.

#### A PROPOSED PLAN FOR THE DEVELOPMENT OF ENGINEERING EXPERIMENT STATIONS AT LAND-GRANT COLLEGES

The proverb says that "The Lord helps those who help themselves." The writer suggests the following plan of procedure:

(1) Organize formally, by college initiative, an engineering experiment station at each Land-Grant College. This can be done by action of the governing boards without any special state or federal legislation.

(2) Let each governing board allot college funds to its station. This can be done without specific state or federal legislation. At least \$5,000 annually should be thus appropriated but even \$3,000 would start the enterprise.

(3) Form a national organization of Land-Grant College Engineering Experiment Stations, with an office at Washington, with a paid secretary in charge, to assist in coordinating the work, to publish a monthly bulletin, and in general to look after station interests, supported by definite annual payments by each station. If 48 such stations were organized and contributed \$250 annually, \$12,000 would be available, which ought to be sufficient for the purpose. It is quite possible that the secretary would not need at the outset to devote his full time to the work.

(4) Establish, through the Washington office, official relations with the National Research Council and with the federal departments interested in engineering research work.

5. Coordinate, through the Washington office, the stations in a national program of engineering research with a view to meeting national as well as state needs.

6. Push federal legislation in behalf of engineering experiment stations at the Land-Grant Colleges.

#### ENGINEERING EXPERIMENT STATIONS

BY H. S. BOARDMAN

The subject of engineering experiment stations has been under discussion at these meetings for a long time and it has been my fortune, good

or bad, to be selected year after year to write upon some phase of the subject. When our secretary made his annual request I immediately suggested that I be laid aside for once and some new blood infused into the discussion. He informed me that he had already made plans for such infusion, but that it would not be successful unless I lent myself to the operation. But, joking aside, I feel that by the time these remarks reach you very little that you have not heard will remain to be said. I am sure that the present condition of the bill now before Congress, which has our official support, will have been brought to your knowledge if you are not already familiar with it, and its present status will have been explained. It is common knowledge that several bills have been proposed in the past few years. Some of them, from our point of view, were fair, some were good, and some were absolutely not to be considered. It is also known that much opposition developed against the movement, centering in the main in the State Universities and private institutions not benefitted by the Morrill Acts. Even these opponents approved of the general idea, but, knowing that they could not participate if legislation designated the location of the stations at the Land-Grant Colleges, they attempted to insert provisions in the several bills so that they would at least stand a fighting chance of receiving some of the funds. The result was, of course, disastrous to the cause. Such a movement requires considerable effort to push it through Congress when all interested give their entire energy, and a divided front means certain failure. The more opposition develops from within the more the chance that outside organizations may attempt to obtain a part or the whole of the proposed benefits. In fact, this situation appears already to have developed, to some extent at least, for now the pure scientist seeks to have a hand in the establishment and administration of these stations.

We represent the Land-Grant Colleges—institutions which have grown into prominence during the past 50 years, institutions which are fulfilling the tasks set for them by the founders in so far as agriculture is concerned. We are, however, only partially fulfilling these tasks in engineering. To be sure, we have our share of the students—oftentimes more than our share—but taken as a whole we are weak along the lines of engineering extension and engineering experimentation. When we attempt to remedy this situation we seek only to establish that which, by virtue of the Morrill Act, is our right. We are not trying to usurp any prerogative of other institutions. We are not attempting to get something away from them. We are only trying to round out our federal institutions, to make them fulfill their original purpose, to create a service which is ten times more necessary today than it was when first conceived, and is becoming more and more necessary with advancing years. We do not feel that opposition from these sources is well directed, and a careful analysis of the arguments will show that institutional jealousies are an important factor. They seem to fear that we will get something that they have not, that we will benefit at their expense. What will be the outcome? I fear there will be no outcome until the “dog-in-the-manger” attitude is abandoned and a less selfish spirit is shown. I do not believe that we can win out against our opponents for many years, if ever; nor can they unaided secure their ends. They must be brought to our way of thinking, must become converted. How, I do not know, but is it not worth while for us to try to find out how?

Meetings have been held in an attempt to compromise our differences. In fact a compromise bill has been prepared; but such compromises are usually of questionable value, for they fail to get either party anywhere. Conversion seems to be our only hope of immediate success. That success will finally attain our efforts I do not doubt, but while we wait time is passing—time, during which many states should have the benefits which engineering experiment stations could afford.

R. L. SACKETT of Pennsylvania. The Smith bill, even if modified in Section 5 as is suggested, does not obviate the possibility of controversy. However, I for one am willing to support this measure as thus amended, provided the great majority of the presidents of our Land-Grant Colleges favor such action and the institutions as a whole seem likely to be benefitted.

G. W. BISSELL of Michigan. Are we not attempting to compromise upon a principle for which the Engineering Division has been contending for many years? I specifically recommend the amendment of Section 5 of the Smith bill in its modified form, as now before us, by the elision of the words "approximately equal to those of other institutions of that State."

#### ENGINEERING EXPERIMENT STATION LEGISLATION

BY C. R. JONES

During the late nineties, when I was still a youngster in administrative affairs, the engineering experiment station bill then before Congress was urged with much vigor. The bill received the support of the Land-Grant Colleges, was an excellent measure and should have been enacted into law. The same arguments were made in favor of its passage as have been made for the passage of the Newlands bill and its successors. For some reason interest in the bill suddenly ceased and it was not until the first meeting of the Land-Grant College Engineering Association was held that organized interest in the measure which rounds out the land-grant college educational program was revived. All who attended that meeting believed that the country at large had committed a trust to the engineering divisions of the Land-Grant Colleges and that it was the duty of the administrative officers of these divisions to take the lead in promoting the industrial welfare of the country, to point out omissions in legislation and to formulate and propose legislation needed to carry out the trust that had been committed to them.

Further progress was made at the 1915 Convention where "the executive committee (of the Land-Grant College Engineering Association) was authorized to take such steps as seemed advisable in the furtherance of the campaign to secure federal aid in the interests of engineering experiment stations. (Fourth Proceedings, in Twenty-ninth Proceedings, page 281.) There has never been a question as to the vital need of engineering experiment stations and it is generally agreed that they should be widely distributed, one in each state and territory. Apparently the bill should have had an easy and speedy passage. If the Association had been less open in its discussions and procedure and if it had been introduced by some one who would have vigorously pushed it, it is possible that the original Newlands bill might have been enacted before those with green eyes and itching palms had had a chance to develop any organized opposition. The

course followed by the Association has been open and straightforward and in the line of duty. For my part I can see no occasion for criticism.

This measure has been the chief topic of discussion at divisional meetings for the past four years and while it would seem that we have apparently been marking time, some real progress has been made. This may be summarized as follows:

1. The fact that the country needs stations of the type proposed has been quite thoroughly established and it is no longer necessary, at least among ourselves, to rehearse the arguments in its favor.

2. It is generally accepted that these stations should be widely distributed and that the most practical distribution is secured by establishing one in each State and Territory.

3. The form that the bill should take and its general provisions are fairly well defined.

4. The only obstacle preventing a united front in pushing the bill is the determination of the question whether the stations shall be definitely located at the Land-Grant Colleges by the terms of the bill itself or whether the state legislatures shall designate their location in their respective States. So long as this Association maintains its uncompromising attitude on this point there seems to be no hope for passage.

The one overpowering principle involved is the vital need of the engineering experiment stations, compared to which the other points just mentioned are matters of detail. The question as to the location and as to the agency to be designated to carry out the purpose of the bill is an important detail. The Land-Grant Colleges have been the acknowledged educational agencies of the Federal Government, the stations are needed to round out existing legislation and precedent is in favor of the colleges already receiving federal aid. The legislatures of the several States chose the locations for these colleges and still have the right to relocate them where both instruction and research can be most effectively carried on. We have rightly taken the position that the station and college should go together. On the other hand, precedent is not wholly lacking in favor of the point of view of those who would place the location in the hands of the state legislatures. The Hatch Act, the counterpart of the proposed bill, is a case in point. For example, the Georgia agricultural experiment station was located in 1889 at a site other than that of the State College of Agriculture. In most of the States by the terms of the compromise bill submitted by President Riggs, the stations would necessarily be located at the Land-Grant Colleges and unless we recede from the position which we have taken each year and confirmed again last year and follow some such plan as that suggested, it seems unlikely that the deadlock can be broken.

It is immaterial to the institution which I represent which form of the bill prevails, whether the location is determined because it is the State University or because it is the Land-Grant College. We have, however, as a matter of principle, stood by the action of this Association and doubtless will continue to do so. I have not even answered the voluminous letters from the opposition. But I feel that the time has come when we should yield in the matter of a detail rather than endanger the larger principle involved. Otherwise we might just as well drop the whole matter for there seems to be no possibility of tiring the other fellows out.

The important thing to my mind is that we should stand solidly behind



a bill to establish engineering experiment stations in the several States and let Congress decide the detail that is in dispute. I have a feeling that in the end it will be settled in our favor and that Congress will not want to subsidize or support new educational agencies.

**HOWARD EDWARDS** of Rhode Island. This Association can not afford to compromise on this matter. If we ourselves invite or suggest to Congress the possibility embodied in this compromise, we are estopped in the future from protest. We have sold our birthright. These stations should be placed at the land-grant institutions by the terms of the bill itself. There should be no intimation that they can be placed elsewhere.

**F. E. TURNEAURE** of Wisconsin. The compromise does not seem to me to be a serious matter. It should receive our support.

I urge the various institutions to take Dean Marston's suggestions to heart and to attempt to establish engineering experiment stations even though at the outset it be in a small way.

**C. R. RICHARDS** of Illinois. The sudden establishment of 48 engineering experiment stations would tend to handicap present governmental research agencies which now are none too well supported, none too well able to prosecute the activities which they are designed to foster. In my opinion, better results will be accomplished if more adequate support is given to the research agencies now in existence than if new enterprises are established. Furthermore, the Smith bill, if passed, would be likely to hamper the freedom of institutional action, since it gives too much power to the Secretary of Commerce. I feel that Section 6 in the proposed measure should be so modified as to reduce supervision to a minimum and that Section 8 should be so drawn as to prevent the proposed stations becoming essentially adjuncts to the Bureau of Standards.

**S. P. CAPEN**, U. S. Bureau of Education, Washington, D. C. The proposed compromise from the legal point of view seems to me an entirely proper one. The Land-Grant Colleges have no monopoly upon federal support. It is entirely possible and proper for Congress to appropriate funds to colleges other than those created by the Morrill Act of 1862. However, regardless of the outcome in this respect, I deprecate too rigid governmental supervision, believing that its tendency is to interfere with freedom of action.

**T. H. TALIAFERRO** of Maryland. I understand that the present wording of the bill does not limit the location of the proposed stations to state institutions. It is my conviction that its wording should be so modified that their location should be restricted to such institutions.

**T. D. BOYD** of Louisiana. I agree with Dean Taliaferro that engineering experiment stations should be placed only at state institutions.

On motion, the Chair appointed a committee consisting of Deans G. W. Bissell of Michigan and C. R. Richards of Illinois and President K. G. Matheson of Georgia State School of Technology\* to report at the next divisional session concerning the Smith bill.

\*Not a Land-Grant College and, therefore, not a member of the Association. Committee appointment made under misapprehension on part of the Chair.

On motion, the Chair appointed a committee consisting of Deans R. L. Sackett of Pennsylvania, G. W. Bissell of Michigan and J. C. Nagle of Texas, to report at the divisional session touching the coordination of engineering experimentation in land-grant institutions.

The nominating committee suggested as officers for the ensuing year Deans F. E. Turneure of Wisconsin, chairman, and R. L. Sackett of Pennsylvania, secretary.

On motion, the Division took a recess until 2 P. M., Thursday, November 13th.

#### AFTERNOON SESSION, THURSDAY, NOVEMBER 13, 1919

The Division was called to order at 2 P. M. by the chairman, President W. M. Riggs of South Carolina.

**THE CHAIRMAN.** The Committee on Engineering Experiment Station Legislation is recognized for report by its secretary, Dean C. R. Richards of Illinois.

**C. R. RICHARDS.** The Committee on Engineering Experiment Station Legislation respectfully reports as follows:

Your committee, appointed to consider pending engineering experiment station legislation, by a majority vote has agreed to recommend the acceptance by this Division of the so-called Smith bill (S. 16, Sixty-sixth Congress) in lieu of the measure proposed at the Baltimore meeting of the Association, subject to the following changes and amendments:

*Amend* the title by inserting the word "State" before the words "Engineering Experiment Stations," and the word "and" between the words "States and Territories."

*Amend Section 3* by the substitution of the word "funds" for the word "means" in the seventh line.

*Amend Section 5* by substituting the following for the last two sentences—"Whenever an appointment is made in accordance with this Act and reported to the Secretary of Commerce as hereinbefore described, a payment to the said school, college or university equal to one-fourth the annual appropriation shall become payable and subsequent payments on the dates above stated. The Secretary of Commerce shall make corresponding appointments in the Territories."

*Amend Section 6* to read as follows:

"The responsibility for the initiation and conduct of research shall rest with the individual engineering experiment station; but, in order to secure practical uniformity of methods, efficiency and economical expenditure of funds in the research work of said stations, and to avoid useless duplication of such work, the Secretary of Commerce shall render such assistance as will best promote the purpose of this Act. It shall be the duty," etc. (as already provided).

*Amend Section 8* by inserting the words "promoting effective cooperation" in place of the words "maintaining uniform standards" in the first line; and by striking out the word "especially" in the ninth line.

For the Committee,

C. R. RICHARDS.

On motion, the report was approved and referred to the Executive Committee for consideration.

**THE CHAIRMAN.** The engineering phases of the A. E. F. vocational work will be discussed by Dean Louis E. Reber of the University of Wisconsin.

#### EDUCATIONAL WORK IN THE AMERICAN EXPEDITIONARY FORCE IN ENGINEERING AND TRADE SUBJECTS

By L. E. REBER

The first definite step toward an educational program for American soldiers abroad was taken in February, 1918. At this time the carefully prepared report by Dr. A. P. Stokes (Yale) on the desirability and possible scope of educational work in the A. E. F., was submitted to General Pershing by Mr. Carter, Chief of the Y. M. C. A. of the A. E. F. The report was approved and in the course of time general orders were issued authorizing attention to educational needs and presenting the general terms of activity to be undertaken. Up to the time of the armistice the Army was concentrating all of its strength upon military affairs and could not itself assume any obligations for subsidiary efforts, no matter how important. It was arranged, therefore, that the Y. M. C. A. should select a commission of three to plan and supervise the educational work with the advice and authority of the chief of G2, G. H. Q., at their disposal. Under this scheme all local administration and every form of discipline and control were to remain in the Army. The teaching was to be done by army officers and enlisted men, Y. M. C. A. secretaries and, wherever necessary, by teachers taken to France for that purpose.

Some months after the cessation of hostilities the educational commission and its large staff of special advisors, local educational advisors, and teachers were taken over by the Army and became the Army Educational Corps, a civilian branch of G2. The fundamental relationship between the educators and the army administration remained unchanged. Educational matters were determined by the commission or its assistants in charge of particular branches while executive functions were controlled by or through army officers assigned to cooperate with or assist the educational chiefs. The teaching was done by the best equipped available man, whether major or private, Y. M. C. A. secretary, or army educational corps man.

#### TYPES OF SCHOOLS

The program was most comprehensive. It contemplated the taking to France of 2,000 or more teachers, lecturers, and specialists. No limits were set upon the subjects to be offered. It was hoped that every soldier who remained in France for many months would be offered an opportunity to take work for which he was fitted. The illiterates, estimated according to rigid standards as several hundred thousand in number, were to be required to learn to read and write. The industrial and farm workers who had lost two years of practical experience were to be given an opportunity to take intensive vocational work. The student whose course in high school or university had been interrupted was to have a chance to resume his studies while awaiting his turn to go home. Courses calculated to improve citizenship were to be presented in attractive form so that the men would return

with increased interest in and capacity to deal with the serious problems of the day.

Although the time available was not great, and the difficulties were unsurmountable in certain specific instances, the far-reaching educational plans were in the main realized.

Three types of schools were used:

First, post schools were established wherever troops were stationed. In these were given elementary courses and any other courses for which teachers and equipment were available. The classes were held in any suitable building, generally the Y. M. C. A. hut. An army officer was assigned to take charge for the local commanding officer. The divisional educational advisor and educational officer had supervisory authority.

Second, at the headquarters of each division, divisional schools were established. It was the intention of the commission that there should be made available at these centers sufficient equipment and a sufficient number of special instructors to make possible vocational classes of whatever type was in demand. Examples of subjects widely introduced in divisional schools are gas engines and motor mechanics, agriculture, mechanical drawing, electricity, air brakes, carpentry, telegraphy, telephone repair, and stenography. In addition to the work of a vocational nature classes of a standard comparable to that of our high schools were conducted. Men from outlying outfits were sent to the divisional headquarters for a course of study lasting generally months.

Third, for higher education a center was established for all troops serving over-seas. This was the A. E. F. University at Beaune, Cote d' Or, France.

Before describing in detail the American University, two other forms of educational work should be mentioned in order that the general field covered may be understood.

The first of these involved work in engineering and other subjects of very great value. This was the provision for placing men in the universities of France and England. The French universities, after protracted negotiations, agreed not only to admit men from the A. E. F., but in many instances planned to make special provision for them. In practically all, special classes in French were provided. The qualification for entering both the French and English universities was at least a two-year college course, and, in the case of the former, ability to write and speak French was stipulated. The demand for assignment to foreign universities was far in excess of the number of openings. Ultimately 7,000 students were placed in France and 3,000 in England.

To attempt to measure the value of this contact with the institutions of higher learning of Europe by what was absorbed of ordinary formal education, would be a great mistake. The contact which our men enjoyed with the foreign academic life, with traditional educational procedure, and with things French and English, pertaining to the universities and to the life of the educated classes attending these institutions, seems to me to be of inestimable value both to the individual A. E. F. student and to this country.

To complete the list of major activities provided for the Army in Europe, mention must be made of the great number of individual lectures and the institutes, specifically the agricultural and citizenship institutes. At

all important troop centers and at a great number of comparatively small centers, individual lectures and lecture series were offered with great success measured in numbers voluntarily attending and interest aroused. Many agricultural and citizenship institutes were in the field, each group offering a two-, three-, or four-day course of lectures and discussion. In the case of the citizenship institutes it was generally arranged that practically all of the soldiers of the district not doing other educational work be assigned to the two- or three-day course, 200 being taken for each period. Hundreds of thousands were reached by each of the types of institute. The routine of lecturers and institutes and the supervision of the subject-matter presented were the function of central organizations created for the purpose.

In addition to the divisional and local administrative machinery there was similarly what may be termed a departmental central organization for the A. E. F. for each general group of subjects taught in the schools away from Beaune. For example, the trades vocational work was the responsibility of a central organization. The duties of the central authorities were almost wholly confined to the securing of texts, the preparation of syllabi, and the encouragement of local organization. The whole work involved the purchase of several million dollars worth of texts, a matter which was attended with serious difficulties owing to the necessity of losing no time. The requirement that work begin before the books had arrived increased the responsibilities and embarrassments of those to whom fell the duty of outlining courses. An example of the method sometimes made necessary was afforded by the preparation of an outline for a course in barbering. By conferences and interviews with physicians, health officers, chemists, and barbers a remarkably effective course was developed by a man who was neither a barber nor a doctor, but was a thoroughly competent vocational school teacher.

#### THE UNIVERSITY

The idea of building a temporary institution of higher learning within a period of weeks, using labor, material, and equipment, and in large measure faculty personnel secured from the Army, in other words, of organizing a university out of the Army, appealed to the foreign imagination, particularly to the minds of those familiar with the difficulties involved, as a rare example of American ideals and enterprise. That the plans and hopes of the founders were realized cannot be seriously questioned. Beaune, a small town in central France, a few miles south of Dijon, was selected because there was there a tract of land assigned to our Army with some 300 partially constructed huts and small buildings and the beginnings of streets and roads, an undertaking which would have been a base hospital of 20,000 beds had the war continued. The site was selected in the latter part of February, 1919. Within a month the 300 buildings were completed, over 200 others were built, and a large assembly hall was erected. By early April the university had opened its doors to 7,000 students and was running smoothly. Six hundred instructors had been secured from the Army and elsewhere, an entirely new military organization had been formed to provide for them, courses had been laid out, a large library had been created, class rooms had been equipped, and many of the very valuable laboratory sets had already been secured. It was really a marvellous—an almost impossible—achievement.

The greatest problem in developing the engineering college was that of securing instructors. It had been planned originally to secure in America a large number of teachers, but this was found to be impracticable. It became necessary, therefore, to search the army records for men whose experience seemed to indicate that they would be capable of taking charge of university classes. The labor of looking through the records of men of all grades was in itself enormous, and unfortunately the difficulty was not often solved by finding desirable prospects. Although every effort was made to force, if necessary, commanding officers to release men who were not absolutely necessary to their organizations, it can well be imagined that delays and disappointments were not infrequent. Sometimes, also, judgments made from army records were faulty and new selections became necessary.

The question of personnel caused many anxious moments for the college of engineering during the organization period, but the final achievement was in every respect satisfactory. There was secured a staff of 110 capable and well-trained men, many of whom had had teaching experience. The war experience had given to each man traits of character particularly valuable in a teacher.

Only one subject was assigned to each instructor. This enabled him to prepare thoroughly for his classes. By means of the mimeograph, photostat, and other reproducing apparatus, every facility was given for the distribution of notes, diagrams, outlines, etc. to the students.

Such devices were especially required because of the shortage of texts. The engineering college had sent men to England to secure texts to serve until those ordered from the United States arrived, but when work began the number of books was far short of normal requirements. In a number of cases one book drawn from the library served as the source of material for all and in one or two instances the instructor was compelled to prepare for himself the material for the opening days. Fortunately this condition was soon removed or alleviated by the arrival of personally conducted shipments from base ports.

The engineering college offered 63 courses: 18 in civil engineering, 17 in electrical engineering, 22 in mechanical engineering, and 6 in mining engineering. The subjects presented were in the main those which are given prominence in the schedules of any engineering college. We were quite willing to modify our program somewhat to suit the special qualifications and fitness of available instructors and equipment, because it was apparent that without limiting the scope of our work, we could in this way best achieve our end. Practically all courses called for by the engineering students were to be found in our catalog.

No distinction was made between senior and freshman subjects. The entrance requirement for the college was the completion of a high school course. In addition in every case the prerequisites essential to carry any particular subject were insisted upon.

Many men who entered the university were college graduates who wished to do work which would aid them in their professions or vocations. One example typical of many is that of a civil engineer, a graduate of Cornell, who had been in professional work for ten years and who came to Beaune to take work in road construction.

Four great alldromes, three placed end to end, served as the principal

engineering laboratory buildings. The three hangars had a combined floor space of approximately 25,000 square feet and housed the larger pieces of machinery such as steam units, machine tools, electric generating sets, transformers, etc., etc. The boiler room was in an adjoining building. Separate buildings were provided also for the carpentry shop, equipped with electric driven machines, and the telegraph, wire and wireless, and telephone laboratory. Our wireless received daily messages from the United States and other countries. The fourth hangar was an airplane laboratory, equipped with all accessories for ground instruction in airplane mechanics and design and airplane motors. There were eight complete airplanes of different makes as well as additional motors for test and study.

The civil engineering department was equipped with tractors, plows, scrapers, road rollers, etc., for highway construction, and laboring men were provided to build the various types of highways under the direction of the classes in highway construction. A water-driven lighting station fully equipped with measuring devices for hydraulic testing purposes was made available by the city of Beaune.

The University of Dijon generously supplied the mining department with large sets of minerals.

In the large airdrome was installed the machine shop, consisting of a considerable number of electric driven lathes, presses, etc., the gas engine equipment, with many engines of different types and makes; the automobile laboratory with 20 machines of different makes, and much other valuable apparatus. The steam equipment, for example, consisted of three 100 H. P. Chandler and Taylor-Corliss type engines, one 90 H. P. slide valve throttling engine, two 500 K. W. Westinghouse-Parsons steam turbines, five steam pumps of various sizes, a large assortment of accessories, two locomotive type boilers, one hoisting unit consisting of boiler and engine, and one German 60 cm. steam locomotive. In every field of engineering we found that the Army could supply modern equipment of American, English, French, and German make of such a type as entirely to meet the educational requirements of a laboratory.

To select this equipment, to have it brought from all parts of France, and to have it installed, was a problem of no small magnitude. The Army was jealous of its methods, an obstacle which had to be overcome if the laboratory was to be equipped in time for use in a three months' term. But through the appreciation of the commanding officer, red tape was cut, material was selected from the depot before the order had reached there, was put upon a train or upon motor trucks and was personally convoyed to the university in record time. A battalion of engineers was sent to Beaune to erect it. The laboratories were two-thirds of a mile from the railroad. A 60 cm. track was laid on this distance in 48 hours and the equipment moved into place by a gasoline locomotive which was itself part of the engineering equipment.

The college of engineering occupied in all seven buildings, and four large hangars or airdromes, having its own telephone exchange and lighting plant.

The classes which were studying subjects which were more directly related to industrial processes, made tours of inspection to various centers in central and southern France.

The American University, during the short period of its existence,

undoubtedly did a tremendous work in a wide field. Ten thousand students (3,500 of those at Allerey studying agriculture) were enrolled for the three-months' course in subjects including agriculture, engineering, law, medicine, business, journalism, science, letters, art, music, etc. The administration and instruction were on the whole efficiently conducted and the students were probably uniformly more interested in their work and more ready to give their best efforts to its accomplishment than are those of any American undergraduate college in this country.

**THE CHAIRMAN.** Supplementing what has just been said it may be of interest to you to know that each little town had a post school and taught everything from the three R's to advanced college subjects. The soldiers were not excused from military duty when attending the post school. The divisional schools were organized in much the same manner as the vocational training detachments of the S. A. T. C., but were standardized to lead to better results. The educational work with the A. E. F. has demonstrated the advisability of coupling military training with education.

The "Present Status of Agricultural Engineering Instruction" will be discussed by Deans E. C. Johnson of the State College of Washington and J. C. Nagle of the Texas Agricultural and Mechanical College and others.

#### THE PRESENT STATUS OF AGRICULTURAL ENGINEERING INSTRUCTION

By E. C. JOHNSON

The quick response of the land-grant institutions to the demands of the times is nowhere more noticeable than in the rapid development of instruction in agricultural engineering and the increasing importance of agricultural engineering subjects in their curricula. Agricultural engineering instruction was first inaugurated in 1903 and now departments, divisions or sections of agricultural engineering, rural engineering, farm engineering, farm mechanics or farm equipment have been organized in from one to five colleges each year from 1904 to date. Agricultural engineering is now taught in practically every land-grant institution.

When your secretary asked me to discuss before this meeting the present status of agricultural engineering instruction in the Land-Grant Colleges, I appreciated that the subject was indeed a live one and that it would be a pleasure to get in touch with and to work with the aggressive and efficient young men promoting agricultural engineering education in order to determine, if possible, its present status. This paper has been made possible in the main through the assistance of Prof. J. P. Fairbank, head of the Department of Agricultural Engineering in Washington State College, who is responsible in large measure for collecting the data here reported upon and through the courtesy of the agricultural engineers, deans and other faculty members the country over who have kindly furnished the desired information.

The report is based on answers received from 39 of 48 land-grant institutions, to which requests for information were sent. From 9 institutions, including Wisconsin and Minnesota, no replies have been received. Had they been in hand, it seems probable that the general trend of this paper would not have been materially changed nor would its statements as to



general policies been appreciably modified; yet nevertheless, their omission should be borne in mind when considering this report.

Beginning with the organization of work in agricultural engineering in Iowa State College in 1903, the subject was rapidly introduced into other schools. In 1904 one college added similar work; in 1905, one; in 1906, two; in 1907, two; in 1909, three; in 1910, one; in 1911, two; in 1912, three; in 1913, five; in 1914, two; in 1915, one; in 1916, two discontinued the work; in 1917, two; in 1918, none; and in 1919, five (including an institution which discontinued the work in 1916). In 19 instances the work is given in distinct departments, while in 12 it is still a part of the work of the department of agronomy. In 30 instances the work is given in the College of Agriculture, in five in the Colleges of Agriculture and Engineering co-operating, and in two instances, in the College of Engineering.

The enrollment in these subjects is large, 34 institutions reporting 6,580 students. The writer interprets the replies for the most part as referring to student-subjects rather than to total numbers of students, since one individual may take several agricultural engineering subjects at one time. Fourteen colleges report less than 100 students in agricultural engineering, 15 from 100 to 200; one 300, two 500, one 700, and one 2,000. Five state institutions give the degree of Bachelor of Science in agricultural engineering, and have 117 candidates for this degree. Seven offer majors in agricultural engineering, parallel to such courses as animal husbandry, dairy husbandry, etc., with a total enrollment of 142 students. No course leading to the degree of Master of Science in agricultural engineering is reported. The remaining colleges offer agricultural engineering in the form of service courses to students in the College of Agriculture.

#### REQUIRED COURSES

In the majority of instances some course or courses is required of all students majoring in agriculture. Farm machinery is required in 20 institutions; farm buildings and farm shop (including farm repairs and farm mechanics) in seven; farm motors in six; drainage, farm power machinery and forge work each in four; woodwork in five; farm surveying in three; and farm equipment and farm mathematics each in one institution. All courses are elective at three colleges. A course in farm machinery was required at the State College of Washington prior to this year. However, in view of the fact that a large proportion of its students taking work in agricultural engineering are thoroughly familiar with ordinary farm implements, arrangements have been made whereby courses either in farm machinery or farm shopwork may be substituted.

#### SUBJECTS OFFERED

A survey of 21 land-grant college catalogs indicates that farm machinery is offered in 21; farm motors and farm buildings in 18; farm mechanics and shop work in 17; concrete in 10; drainage in 9; tractors in 7; farm and agricultural engineering in 6; farm machinery and farm motors each in 5; drainage and irrigation and research each in 4; farm power, dairy machinery, sanitation, roads and automobiles each in 3; wood physics, farmstead equipment and drawing each in 2; and sawmill machinery, horticultural machinery, graphic methods and thesis each in one institution. It

is interesting to note that all the colleges offer a course in farm machinery and most of them courses in farm motors, farm machinery and farm shop. The trend seems to be towards the mechanical engineering phases of the work rather than the civil and architectural phases. This probably is accounted for by the fact that, in the past, a large proportion of the men teaching agricultural engineering have been graduated in mechanical engineering.

#### WORK ENTERED UPON BY GRADUATES

There seems to be a very large field of usefulness for graduates of agricultural engineering courses. The rapid multiplication of tractor and power farming, machinery is attracting many men. Nine colleges report that some of their students have become sales and service men for tractor and machinery companies; eight that their students have become farmers; six, teachers; three each, auto-mechanics and rural architecture; two each, farm managers, extension specialists, county agents and agricultural engineers; and one each, contractors, highway engineers, editors, consulting engineers, oil promoters, marine engine operators and bankers. The field of work for the agricultural engineer, therefore, is already large and destined to grow as farm equipment becomes more complex, as labor-saving becomes more necessary, as economy, permanency and beauty in farm structures are emphasized, and as reclamation of land by stump pulling, drainage and irrigation is found to be more necessary.

The rapid expansion of this field is nowhere more clearly indicated than in the demand for short courses and extension work in agricultural engineering. Most of the colleges offer short courses in which these subjects are featured, the more popular ones, apparently, dealing with tractors and power farming. The total annual attendance at ten such short courses from one week to three months long is 1,405, ranging from 50 to 350 students at each school. Five colleges give a series of repeated courses of from one to three weeks' duration with attendance limited to about 25 students per course. The transactions of the twelfth annual meeting of the American Society of Agricultural Engineers, held in December, 1918, contains a complete report as to these short courses.

Regular extension work in agricultural engineering is also becoming an established function of many institutions. Thirteen report extension work in farm buildings, 12 in drainage, 6 in farm engines and tractors, 4 each in terracing, farm equipment, water supply and irrigation, 3 in sewage disposal, 2 each in silo construction, farmsteads and power farming, and one each in land clearing, farm machinery, general farm mechanics schools, milking machine schools and soil erosion control. Twelve of the 28 institutions reporting on extension work conduct it through the resident faculty; 11 through extension specialists and 5 both through extension specialists and resident faculty. Many extension specialists devote their full time to this work.

#### THE AGRICULTURAL ENGINEERING FACULTY

So rapid has become the development of agricultural engineering, as indicated by the number of institutions offering courses, by the number of students enrolled in them, and by the extension work required, that a relatively large number are engaged in teaching the several subjects. The

demand is brisk for men to fill new positions as created and old positions as vacated by men entering commercial work. Eleven men are employed in one, 9 in one, 7 in two, 6 in two, 4 in two, 3 in six, 2 in eight, and 1 in 12 institutions. Many colleges find themselves unable to fill vacancies and some have sought for men for months without success. It would seem under such circumstances that high salaries would be paid; but such is not the case. The highest salary paid to a department head among the 12 institutions reporting on this phase is \$3,500 per annum.\* In the other institutions the salaries of full professors range from \$2,000 to \$3,250, the average for 12 full professors in 12 institutions being \$2,794. The salaries of 11 associate professors in 11 institutions range from \$1,800 to \$2,800, with an average of \$2,255; of 25 assistant professors in 20 institutions from \$1,500 to \$2,500, with an average of \$2,120; of 15 instructors in 11 institutions from \$1,500 to \$2,100 with an average of \$1,693. The salaries of assistants range from \$500 to \$1,200 with an average of \$870; of mechanics from \$900 to \$1,320, with an average of \$1,113; of draftsmen from \$1,500 to \$2,000 with an average of \$1,690; of tool-men from \$840 to \$900 with an average of \$870; and of extension specialists from \$1,800 to \$2,250 with an average of \$2,066. It is interesting to note that janitors are reported as receiving higher salaries than mechanics, closely approximating those paid to draftsmen and the lower priced instructors. A survey of the entire salary scale convinces one that these salaries, paid by our colleges to men whose positions call for thorough training, skill and teaching ability, are far too small when viewed in the light of the present cost of living and in comparison with the wages received by unskilled labor in the very industries which engineers have made possible. Unless a rapid adjustment either in salaries or in the cost of living is made, the standards of the teaching profession in agricultural engineering, as well as in other lines, necessarily will be lowered by the rapid desertion of its most efficient men to commercial pursuits and their replacement by men who are less well trained, who are less able instructors and who have a narrower outlook and a restricted point of view.

#### LOCATION OF AGRICULTURAL ENGINEERING INSTRUCTION

One of the most interesting points from an administrative point of view brought out in this inquiry was the opinions of those in charge of agricultural engineering instruction with respect to which college or major division of a college should offer the agricultural engineering courses. According to 22 replies it is felt that the work should be handled by the College of Agriculture, to 5 by the College of Engineering, to 5 by the Colleges of Agriculture and Engineering cooperatively, while in one case it is felt that local conditions should control. No preference was experienced in four cases. In two cases in which the work is given in the College of Agriculture the reply stated that were they to do it over again it would be located in the College of Engineering; 5 would change if they could from agriculture to agriculture and engineering working cooperatively; one from agriculture and engineering to engineering; and one from engineering

\*It should be noted that only 12 institutions reported on salaries. The maximum here given, to the knowledge of the speaker, is exceeded in a few institutions. The figures, however, based on the 12 reports illustrate the general condition with regard to salary and the average probably approximates what the average would be were reports available from the other institutions.

to agriculture; and it is interesting to note that during the year in one instance the change has been from engineering to agriculture.

The general tenor of the reasons given for conducting the work in the College of Agriculture is indicated in the following quotations:

"The agricultural school is the logical place in which to offer courses in agricultural engineering, since it should be taken up entirely from the farmer's point of view, making use of engineering principles."

"Our work is for the benefit of the future farmer. We are trying to teach him how best to use his equipment, land and buildings and are not training engineers."

"The point of view is seldom correct in the College of Engineering."

"We take the point of view of the farmer and not of the engineer."

"Agricultural engineering subjects should be taught in the agricultural department because, as a general rule, engineering departments are not particularly interested in agricultural engineering, and, moreover, few engineers have sufficient agricultural training to do good work. The problems of the agricultural engineer are crop problems, soil problems, farm management problems, etc. The building problem is how to economically house stock, not how to build a barn."

"Keep close to the engineering college but by all means retain the agricultural point of view. Engineers rarely understand rural engineering."

"The department must be correlated with agriculture and must be administered by men having the agricultural point of view."

The point of view of those who believe the work should be given by the College of Engineering is illustrated by the following:

"Modern agricultural engineering is more closely related to engineering than to agriculture."

"The course should be practically the same in the freshman and sophomore years as in any other engineering course."

"There is need for an engineering atmosphere; exactness and absolute correctness to detail are not emphasized in the College of Agriculture as much as is judgment."

"In a small institution the College of Engineering is the only division prepared to give the course. It is more of an engineering and mechanic arts proposition than it is an agricultural one."

The reasons given for having the agricultural engineering work administered by both colleges acting in cooperation, are as follows:

"Work in agricultural engineering should be offered to both agricultural and engineering students."

"The degree should be offered in the Engineering College to those who desire strictly engineering work and in the Agricultural College to those who specialize in the agricultural engineering group."

"Full cooperation of both colleges is needed to make a strong agricultural engineering course. Such a combination possesses the advantage of equipment and instructors."

It was evident in studying the reasons here quoted, together with others of a similar nature, that the point of view of those answering this inquiry was colored more or less by the local situation and the local organization. It seems clear to the speaker, however, after having carefully studied all the reasons advanced for handling the work in one or the other college, or in both jointly, that those in charge of agricultural engineering

courses increasingly will come to recognize the need for a very close relationship and cooperation between the two colleges. As a result of such cooperation more adequate equipment is possible, unnecessary duplication of equipment and of courses is avoided, a better faculty can be employed and a more careful training and broader outlook made possible to the student.

An effort was made to determine whether or not the different colleges felt that the interest in agricultural engineering subjects justified the creation of a distinct department of agricultural engineering. There seemed to be great unanimity of opinion that results have more than justified such a differentiation, that agricultural engineering subjects deserve emphasis and that the best way to stress them is to segregate them from other lines of work and to group them as a departmental unit. One advocate of this policy says:

"Yes—enthusiastically yes. I may say with utter frankness and honesty that this department is about the busiest on the college campus, so far as personnel, extension work and helpfulness to the farmer are concerned. Moreover, its work is held in high esteem by other departments of the college."

Only three answers received from 22 institutions ran counter to this feeling and two of these were received from colleges where the work is done in the department of agronomy, while the third originated in an engineering college in which apparently thus far the work has not proved successful.

There is as great a unanimity of opinion among the colleges relative to the general outlook for agricultural engineering education as there is touching the need of distinct departments. The rapidly growing interest in the subject is emphasized, the universally recognized need is set forth, and the difficulty of securing enough instructors to keep pace with the increased enrollments is deplored. Some of the characteristic statements touching these matters follow:

"With the expansion of power farming and the necessity for more efficient operation of farms and a demand for the proper solution of engineering problems related to the farms of this country, there is indicated a distinct need for men with a capacity for solving these problems so trained that they possess the proper point of view."

"The need for better building equipment and the use of more modern machinery as the result of the change from cotton farming to diversified farming have created a large demand for men trained in agricultural engineering subject."

"Agricultural engineering training tends to promote efficiency engineering on the farm. Here in the South under present conditions, labor crisis, etc., it means the difference between progress or stagnation. Present conditions are such that many men either must run their farms economically or quit the business."

"Engineering methods and adequate equipment usage will be more important factors in productive agriculture in the future than they have in the past."

"The present shortage of labor throws all classes of society back on to the labor-saving methods of the engineer. Agricultural engineering, therefore, is an important phase of agriculture at the present time and is so recognized."

"The boys going back to the farm are increasingly electing the courses in agricultural engineering. The call for teachers, extension workers and for tractor and machinery experts is so pressing that I should say that our work has only just begun."

There can be no doubt in the mind of anyone who studies the subject carefully that the field for agricultural engineering instruction is practically unlimited. It is needed in the East, in the South, on the great plains of the Middle West and throughout the Far West. Wherever one travels the most cursory observation furnishes convincing evidence of the increasing importance of machinery and farm power in our agriculture. Labor-saving machinery and man-saving power must needs be utilized to the utmost if the farming of the future is to be as profitable as it should be, and if our increasing urban population is to be sufficiently fed by a relatively decreasing farm population.

#### THE PRESENT STATUS OF AGRICULTURAL ENGINEERING EDUCATION

BY J. C. NAGLE

This paper is presented at the insistence of Dean Potter in the face of protests upon my part to the effect that many others were better qualified to do it; so upon him be at least a part of the responsibility for its shortcomings. I am indebted to Mr. Daniel Scoates, Professor of Agricultural Engineering in the Agricultural and Mechanical College of Texas for helpful information, to the paper read at the Washington (1917) Convention by Dean O. V. P. Stout of the University of Nebraska touching agricultural engineering in the Land-Grant Colleges (Thirty-first Proceedings, pages 241-246), and to such other published data as could be readily located.

The applications of mechanics and engineering to agriculture are so many and so varied that it is difficult to set a limit to, or to formulate a comprehensive definition of, agricultural engineering, or to distinguish certain phases of it from the older established engineering divisions. It is still an unsettled question as to how far engineering instruction should be carried in our Land-Grant Colleges along a separate specialized line dealing with agricultural operations. Mechanics and engineering are applicable to agriculture in so many indispensable ways that every successful farmer should be trained in elementary mechanical applications, and to some extent in certain fundamentals of engineering; but whether or not this training should be as extensive in all cases as the term "engineering" indicates, is doubtful. There is need for a comparatively few highly trained men to direct large operations and to instruct farmers in the applications of certain principles, but there does not seem to be need for considerable numbers of these men.

In some of our institutions instruction is given to agricultural students in all groups, usually as an elective, while in others distinct courses are offered making engineering the principal feature. Illustrative of the diversify of practice, there are Nebraska, Iowa and Mississippi on the one hand which confer the degree of Bachelor of Science in Agricultural Engineering, while on the other are Illinois, Texas and Wisconsin where the student specializing in engineering applications during the latter part of his course receives the degree of Bachelor of Science in Agriculture when he grad-

uates, with nothing to distinguish him—so far as his diploma is concerned—from other agricultural graduates. In most institutions, both in the four- and two-year courses, some agricultural engineering work is required but most of it is made elective. These courses are usually very popular and often the number of students desiring to elect them exceeds the institutional equipment provided for their conduct.

Not only is the scope of agricultural engineering not yet well defined but even the best name to apply to it is not fully agreed upon. Various names, such as "farm mechanics," "rural mechanic arts," "farm engineering," "rural engineering," etc., have been used according to the scope of the work covered by the definition. Professor F. H. King of the University of Wisconsin was among the first to offer courses in farm mechanics and to make experiments upon feed grinders, windmills, pumps, drainage and irrigation. In 1898 the Illinois legislature made an appropriation for a farm mechanics building. Since that time instruction in farm machinery and the application of engineering principles to farming operations have grown rapidly, indeed remarkably. In 1902 Dr. Elwood Mead in a paper read before the American Association for the Advancement of Science said of agricultural engineering that "This branch of engineering is as yet in a nebulous state in this country. So little attention has been given to it that it has no clearly defined limitations, if, indeed, it exists at all." It was his idea that the work should be developed along lines of helpfulness to actual farmers whose chief work lay in agricultural development. Others have felt, however, that a special type of engineer should be developed who need not be a farmer but who should understand scientific farming, one whose energies should be devoted to the solution of problems peculiar to rural conditions.

There seems to be no question but that the instructional work in agricultural engineering should be administered by a separate department, but there is diversity of practice as to whether this department should be made a part of the College of Agriculture or of the College of Engineering. Whether the purpose is to develop real engineers of a special type or whether the instruction given should be for general use by actual farmers, it seems to me to be best to administer the department as a part of the former division, because the purpose of the course is directly to aid and promote agricultural development. The instructors in either case should be especially trained for the work. In a few institutions the work is conducted in both colleges.

During the last few years the application of gasoline and fuel oil engines to farming and related operations has made it necessary for the farmer to become informed as to the use of such engines. Gasoline and heavier oils are used for operating tractors for plowing, drawing harvesting machinery, operating threshing machines, pumps, ensilage cutters and other farm machinery. Trucks for marketing and automobiles for conserving the farmer's time are coming into more general use. The farmer need not be an expert engineer in order to operate these and other farm machinery, but he does need to know something of the basic principles of their construction and how to operate them economically. Too often the present-day farmer does not even appreciate the importance of protecting his tools and machinery from the weather.

The farmer needs also to be reasonably well informed upon the subjects

of farm sanitation, land drainage, terracing, the use of concrete on the farm, and in many portions of the West upon economic methods of irrigation. As a rule the average irrigation farmer is woefully lacking in a knowledge of the proper methods of applying water and in the cultural methods which should follow such application. As coming under my own observation while a member of the Board of Water Engineers for Texas, I mention a case where our Board conducted an experimental farm under a certain canal and there produced three times the crops with one-third of the amount of water used by the farmers under the same canal. The average irrigation farmer appears to try to substitute water for work to the detriment of his land and the reduction of production.

The value of terracing hillside land and draining low-lying or water-logged land is too little understood by the farmer, and when he does awaken to the necessity of terracing he has all too often had the cream of his farm land washed away.

At the 1917 Convention Dean O. V. P. Stout divided the subjects which he considered as necessary to a proper agricultural engineering course into the four general groups which are restated as follows:

Group A. Mechanical engineering: Farm tractors, farm machinery, farm motors, power transmission apparatus, power driven machinery, horticultural machinery, dairy mechanics and machinery, automobiles.

Group B. Civil engineering: Farm structures, rural sanitation, rural water supply, farm surveying, rural concrete construction, irrigation engineering, irrigation practice, drainage, land clearing, prevention of soil erosion, highway engineering.

Group C. Mechanic arts. Rope work, babbitting, soldering, carpentry, blacksmithing, belt lacing, pipe fitting, farm repairs, road building and maintenance, drawing.

Group D. Miscellaneous: Farm mathematics, applied physics, lighting, heating, ventilation, farmsteads, efficiency of arrangements and operation.

This rather formidable list appears fairly well to cover the field, although it would seem desirable to include instruction regarding electric lighting and electrical apparatus under A and to transfer dairy mechanics and machinery to the dairy husbandry department, where it more properly belongs and where it is now generally taught.

The subjects listed under B seem to be sufficiently comprehensive and the last one, highway engineering, too pretentious. This is a broad branch of civil engineering in itself, yet the farmer needs to know something of the fundamental principles of construction and upkeep, including drainage and crown of roads, for all too often he does not seem to realize that it is useless to attempt to make water run up hill, or that the center of a road should be higher than the sides, but not so high as to make travel thereon dangerous. It would seem that this subject, if properly treated, should be sufficiently covered by its inclusion under C.

As courses in agricultural engineering have been developed the grade of teaching has steadily improved. A great deal of pioneer work had to be done because the field to be covered is large and is constantly being widened as new lines of mechanical applications to farm uses are made and as the necessity for more efficient agricultural operations comes to be appreciated and available labor decreases in quantity and increases in cost.



The same methods of presentation will not apply to students with more or less limited mathematical preparation which are used with engineering students generally, but the experience gained has shown that much engineering information can be imparted where student preparation is limited along the lines usually regarded as essential for engineers. The experience gained during the war in training all classes of men in auto-mechanics, and in other special lines, such as topographic surveying and drawing, proves that by concentrated instruction excellent results can be accomplished with very unpromising material. It should be very much easier to secure results with college-grade students in agriculture. Methods of presentation are changing constantly for the better and constant search for improved methods are being diligently sought by the instructional forces of the various institutions offering agricultural engineering courses. The incentive to this is greater where the work is covered in a single department than where it is made more or less of a side issue in several departments. For one thing the student is more likely to feel that the work he is required to take has a direct bearing upon that which he expects to follow after graduation.

It is neither feasible nor desirable to present the same subjects or the same treatment in all institutions for the reason that local conditions enter into the question. For example, the farmer in the humid sections of the East will have little or no use for irrigation methods in his work, although the field for irrigation as an aid to increased production is by no means limited to the arid sections of the West. In strictly grain producing sections the student's time should not be frittered away on cotton ginning or cotton handling methods. And similarly with other lines of instruction which may be of cardinal importance in this or that section where local conditions supply the controlling factor.

Extension work in agricultural engineering has received considerable attention of late. In certain lines it would seem feasible to do considerable good in this way but in others it would appear to be a waste of time to attempt it. The leading lines of agricultural engineering extension work seem thus far to have had to do with farm buildings, drainage, terracing, tractors and farm machinery. We have found a large demand in Texas for bulletins dealing with roads, home sanitation, household conveniences and the use of electricity on the farm. This work is entirely independent of that being done by agricultural extension service and has been handled through our engineering experiment station. There is room for considerable experiment station work along the lines of agricultural engineering and in time it will undoubtedly receive the attention which it merits.

An expensive equipment is needed properly to prepare an agricultural engineering department for the most efficient work, but lacking this much can be accomplished with comparatively limited means. A separate departmental building is desirable. Both edifice and equipment may be made to cost any sum which may be obtainable. The agricultural engineering department equipments in Mississippi, Texas and Georgia are worth approximately \$30,000 apiece, which is about the minimum required for successful operation. Much larger sums have been spent in the North and Northwest. Special buildings have been erected in Nebraska, Minnesota, Illinois, Wisconsin, Indiana and Georgia and other states will probably soon follow their lead.

R. S. SHAW of Michigan. I believe that work in agricultural engineering should be carried on cooperatively by the Colleges of Agriculture and Engineering. The best work is done by teachers who have been brought up on a farm but who are trained as engineers.

H. L. RUSSELL of Wisconsin. Agricultural engineering is concerned with the simpler principles of engineering of value to agricultural students. Professional engineers are rarely interested in these simpler applications.

W. N. GLADSON of Arkansas. I feel that the dual administration of an agricultural engineering course is of doubtful expediency. Agricultural engineering is nine-tenths engineering and one-tenth agriculture.

THE CHAIRMAN. The committee on the coordination of engineering experimentation in our institutions will now report through its chairman, Dean R. L. Sackett of the Pennsylvania State College.

R. L. SACKETT. Your Committee respectfully reports as follows:

REPORT OF COMMITTEE ON THE COORDINATION OF ENGINEERING  
EXPERIMENTATION IN LAND-GRANT INSTITUTIONS

GENERAL STATEMENT

It is generally agreed that a wide field for additional usefulness by means of experimental studies in engineering subjects is now only partly cultivated by the Land-Grant Colleges and that greater effort should be made to stimulate and coordinate this work.

Several institutions are already doing valuable service, using state or private funds or both. It is important that all should be encouraged to devote their energies to the study of local and national problems of an engineering or industrial nature in order to increase our knowledge of natural resources, to improve methods of experimentation, to promote the discovery of new or better processes, and to disseminate the information thus obtained.

METHODS

Several institutions are working or have worked on the same problems or related phases of the same general problems, without discussion of or agreement as to standard methods and without regard to standardization of apparatus. In some cases this may be of little importance, but in others it may be a vital matter if the results are to be accepted by other scientific bodies.

COORDINATION

In case several institutions contemplate investigating the same or related aspects of a problem, there should be some means of communication and coordination in order that methods may be discussed and results corroborated. At present, the workers in one institution may be ignorant of what those in another are doing. In some cases duplication may be desirable and in other cases it may be quite useless.

Your Committee makes the following recommendations:

*First:* That the Chairman appoint a committee of three to serve for one year, to be designated as a committee to coordinate engineering ex-

periment station work in the Land-Grant Colleges. This should be looked upon as a temporary expedient which may serve its purpose until funds are available for the employment of a paid official and the establishment of a central bureau. It should be its duty to collect and distribute information concerning projects under way, and to propose methods of organization, of financing, of research and plans for carrying on investigations for private parties. It should bring into communication those interested in similar projects. The ethics of experimentation might be discussed. If possible a bibliography of work already accomplished should be made. All information collected should be distributed.

*Second:* That each institution be asked to make a contribution of five dollars for the current year in order to meet the expenditures for clerical help, postage, and stationery, etc., necessarily involved in inaugurating this program.

Respectfully submitted,

R. L. SACKETT,  
G. W. BISSELL,  
J. C. NAGLE.

On motion, the report was adopted and referred to the general session.

On motion, the Division adjourned *sine die*.

## HOME ECONOMICS DIVISION OF THE SECTION ON COLLEGE WORK AND ADMINISTRATION

AFTERNOON SESSION, WEDNESDAY, NOVEMBER 12, 1919

The Division was called to order at 2 P. M. by the Chairman, Miss Agnes E. Harris of the State Department of Education of Texas.

THE CHAIRMAN. The first paper of the afternoon on "Unification of Subject-matter in Teacher-training Courses, Vocational Home Economics, Extension work and Research," will be presented by Professor Abby L. Marlatt of the University of Wisconsin.

### UNIFICATION OF SUBJECT-MATTER IN TEACHER-TRAINING COURSES, VOCATIONAL HOME ECONOMICS, EXTENSION WORK AND RESEARCH

BY MISS ABBY L. MARLATT

A brief review of the aim, methods and subject-matter used in teaching home economics is necessary to an adequate discussion of the methods to be used in the unification of the teaching of home-making as it is carried on in the general teacher-training courses, the vocational course in home-making, and the extension work in home economics. With this as a basis, the need for standards may become more apparent than they would without such a review. In brief, the aim of the home economics courses, either in the teacher-training work, in extension work or in research, is the bettering of the homes of the country, the improving of the health of the people, and the establishing, in the family, of standards which lead to building for better citizenship.

The agencies through which home economics teachings are carried on may be divided into five general lines:

1. The public schools, drawing support from state and city funds—the teaching being given in grades, high schools, township schools, agricultural county schools, normal schools and colleges.

2. Public schools supported in part by state and in part by federal funds, including vocational schools both day, part-time, and evening. Courses are also given in agricultural colleges, universities, and normal schools either for their general cultural value or in order to prepare the student to take up professional work along stated lines of teaching, or in professions other than teaching.

3. Private schools, well endowed or partly endowed, are giving courses in home economics training in grade and college preparatory work as well as in college courses. In these the attempt is made to interest the pupil and the parents. It often results in desultory work being given in the more showy phases of the subject.

4. Extension work has been carried on in this country along various lines such as the correspondence courses in connection with the publicly supported schools or the privately endowed schools and in work with short-course schools. Home demonstration agents and home economics specialists are used in the counties or in the state-wide work. State funds and federal funds are used in the boys' and girls' club work, in farmers' institutes, and in women's clubs.

5. The attempt to unify knowledge through research is in part initiated by the Federal Department of Agriculture. A few of the Land-Grant Colleges are definitely allotting funds for research work with the object of increasing the home economics subject-matter. The great majority of colleges and universities are not able to carry on any general research work in the sense of having special investigators detailed for that purpose. That which has been done in most of the institutions has been accomplished by instructors and graduate students working under conditions of over time with inadequate equipment, and the knowledge thus gained at best is meagre. While there may be exceptions to this rule, this in brief covers the methods and the scholastic conditions under which home economics training is given to the girls and women of the United States. Compared with the mass of material that has been presented by the experiment station workers, who for the last 50 years have carried on intensive research in agriculture, the field of home economics is practically uninvestigated.

#### SUBJECT-MATTER

The subject-matter that is usually given under the head of home economics may be summarized under six heads, namely: Housing, feeding, clothing, health (in the sense of disease prevention), labor-saving methods, education (before the school age).

These are often listed under the titles of food, clothing, shelter, health and education; but the labor problem today is such a vital one that it is well to mention it as a separate subject in the general classification.

In attempting to discover the fundamentals which are common to all types of instruction, it is necessary to consider what are the minimum standards and what are the accessories under each subject.

*Housing.* This must be considered from the standpoint of sanitation, structure, space, equipment, relative cost and adequate type of dwelling in which the family may secure privacy during the formative period of childhood.

*Feeding.* The basic standards may be listed in three groups, namely: basic nutrition plus work demands; growth standards; and the consideration of food as an aid to recovery in abnormal states of health.

Under "marketing" should be discussed the wise choice of local products, especially seasonable ones, as well as methods of reducing the cost to meet the limitations of the average wage of the group.

The relation of the cost of preparation to the cost of ready-to-use material should be stressed, including the wise purchase and use of local products, the utilization of the parcel-post and the question of patronizing the mail order establishments.

All other phases of the work may be considered as accessories. Under this head will be listed food preparation, serving and economic distribution of labor in such preparation and serving. A family may be maintained in good conditions of health and growth and its economic standards upheld without preparing or serving food in the home; hence these are listed as accessory rather than as fundamental factors in teaching basic standards in feeding the family.

*Clothing.* In teaching clothing for the family and the use of textiles in the house furnishings and equipment, three important minimum standards to be taught, namely:

(a) The types of clothing necessary for maintaining health in all ages.

(b) The minimum of decorative details to meet and establish standards of culture and of taste.

(c) The economical use of material and time in manufacturing clothing or other household material.

This involves a detailed study of the material manufactured at home as compared with that purchased ready-to-wear, the additional cost of altering the ready-to-wear garments, and when to mend and when not to mend textile fabrics. The actual preparation of clothing for the family is not a basic factor in home economics teaching in regard to clothing, although most workers in the schools and in extension work will agree that knowing how to prepare clothing for the family is a very desirable accessory. However, not everyone need have the training necessary to make the family wardrobe.

Knowledge of the sanitary care of the textiles used in the family clothing and in the house is an essential. This may not necessarily include actual practice in doing the laundry work but it should include the study of the sanitary and economic problems involved in home laundry work as compared with the public or community laundry.

*Health.* Such health teaching as forms part of the home economics instruction is largely a correlation of the matter discussed under the heads of housing, feeding and clothing, together with the basic facts that may be taught in connection with the present knowledge touching heredity, the normal functions of the body and correct methods of work and of play.

*Labor.* The labor problem of the average home is the question of what to leave undone so that the busy housewife may have her health so preserved that she may rear her children to become useful citizens. The systematizing of the labor necessary in the house, the teaching of the shorter cuts, the economic studies which demonstrate what types of work should be taken out of the house and what types must be left in, are fundamental needs in home economics teaching. The modern house presents an engineering problem. The more of the routine work that can be put on the machine-accomplishing basis, the better. Labor-saving devices and the methods of evaluating them from the standpoint of time, money and health are essentials to be taught in this phase of the subject.

*Education.* The sixth group in this classification is the education of the child prior to school age. This is the most valuable contribution that the father and mother can make to national welfare. During the early period, up to the sixth year, the child can be taught the correct standards in health, in habits, in ethics, in honor, even in religion. These standards persist through life as those of us know who have attempted to change them later in the school period.

After the child reaches school age the mother's time should be so arranged that she is free to study and to play with her children, as well as to cooperate with the school instructors in their education.

#### UNIFICATION

This paper deals with the unification of the teaching in relation to the subject-matter but not in relation to the methods of presentation. This is an entirely separate problem and is often modified by local conditions. In

an attempt to review the present status of our subject-matter we are confronted with a situation that needs to be considered with great thoroughness. If we are to present unified subject-matter so that the teaching in the grades, the high schools, the colleges, the normal schools and the extension work shall reinforce one another, then we must have a common basis in regard to the knowledge that we are willing to present.

#### HOUSING

If we study state housing laws we find few approaching Veiller's ideal in his presentation of standards of tenements. Not only do state housing laws vary but there are limitations as to their scope. The power of enforcement is often insufficient. Not only is there a lack of exact knowledge upon which adequate laws may be based but we need intensive research work as to housing problems. An opportunity to do this work was offered in connection with the National Housing Commission, but its career was cut short by the armistice. We need a permanent housing commission.

The necessary housing space for the average family is as yet an unknown factor. We possess very little knowledge as to the necessary space to be allotted to the person, or as to the scientific standards upon which to base the enactment of laws touching the ventilation or disinfection processes needed to make sanitary a house in which disease has occurred. The teacher of the subject is confronted with such variations in laws that the presentation of valid standards is well nigh impossible.

When we consider the relation of the housing cost to the income of the family we are met with differences that make it impossible for the ordinary housing expert to suggest any adequate ratio. A few studies have been made in isolated houses and tenements as to the cost of the building and the possible cost per room to the tenant. This very lack of knowledge in the business world has made the housing situation acute in this country.

From the housewife's point of view it seems that altogether too few studies are available which throw light on the problem of reducing necessary household labor to a minimum. The so-called efficiency kitchens and household engineering books dealing with this subject describe it from the standpoint of preparing an article or book that will sell. The actual experiments on expenditure of time and human energy have not been developed to such a point that they furnish much exact knowledge. A few studies have been made in methods of work but sufficient data have not been accumulated to be used even for comparative purposes. A few studies have been made on the cost of labor in the house as compared with the cost of labor taken out of the house, but these are so fragmentary that the teaching of the subject consists largely of a presentation of results together with advice given the students to make similar studies that will furnish further data on the relation of housing to labor problems in the house.

Speakers tell us glibly of the moral problem that is coupled with the housing problem. We have no studies from which we may draw conclusions.

In all of the housing work we need more exact knowledge, more definite research and more types of houses in which experimental work may be carried on, in order that eventually an arrangement of the house may be made and a plan of work devised that will make the woman who does her own work less of a slave than she now is apt to be.

## FEEDING

The present status in the feeding of the family may be discussed in relation to nutrition and cost. We are confronted in the outset with variations in the so-called standards in nutrition. Lusk compares the Atwater standard with that of the Inter-Allied Scientific Food Commission:

	Age in years	Atwater	I.-A. S. F. C.
Child .....	0 to 2	0.3	0.5
Child .....	2 to 6	0.4	0.5
Child .....	6 to 10	0.5	0.7
Boy .....	10 to 12	0.6	0.83
Girl .....	10 to 14	0.6	0.83
Boy .....	12 to 14	0.8	0.83
Boy .....	14 to 16	0.9	1.0
Girl .....	14 to 16	0.7	0.83
Men .....	.....	1.0	1.0
Women .....	.....	0.8	0.83

This includes the variation that has been brought about in the last year or so due to the studies in this country and in England.

The variation in standards of weight to height are being used today in the child welfare work inaugurated all over the United States. The standard is that of the "normal child"—a rare individual. Study has been made on the variation of the normal by Dean Bardeen of the University of Wisconsin Medical College which shows that much so-called malnutrition can be classified as normal nutrition with variation around a norm. This gives us more nearly flexible standards for use in our so-called nutrition clinics.

If we could make a scientific curve showing the variation in popular teaching of nutrition it would be an interesting study. Most of the newer data which are today being widely used in the home economics teaching are based on experiments with the lower animals, some of which—in the greatest stretch of the imagination—can not be compared with the human young. Only a few experiments have been made on the animal that compares most nearly to man—the pig. Most of the work done on rats, guinea pigs and other animals has yielded intensely interesting comparable data but it is not necessarily applicable to the human young. Only one State (Iowa) has appropriated money for child feeding studies. This work has been carried on for so short a time that adequate data are lacking. Research work carried on under wise direction is vitally needed in order that we may know more about child feeding. In every state we need research work in matters of human feeding not only in health but in variation from the normal. Most experiments dealing with the digestion of food have been made with from one to five individuals, too small a number to warrant the establishment of final standards.

This field of research needs added funds and added workers. Economic problems in the field of the family seem to rank even higher than the individual problems, great as they are. With the increased cost of living and the consequent decrease in the purchasing power of the dollar the percentage of the income to be spent for food becomes an intensely vital question. That the family be fed is of primary importance, but when it is adequately fed today there is very little left for housing, clothing and education.

The family which on \$800 in 1909 was considered by Chapin as self-



supporting is today on the 50 percent self-supporting basis. Compared with the purchasing power of the dollar in 1897 it is on a 33 $\frac{1}{3}$  percent self-supporting basis. The Federal Department of Agriculture started an important nutritional study during the period of the war. In this study there is a great mass of material which, if digested, would afford us data of value in teaching the need for better economic expenditures; but because of the curtailment of the appropriations this phase of the study has not been completed. It is a form of congressional parsimony that can not be defended. The home economics workers in their attempts to teach the women of the country better methods of utilizing their incomes have thus lost valuable data which are stored away because of lack of money to finish the study.

It is true that in practice cottages all over the country studies are being made as to the economical expenditure of money for the feeding of the family but rarely do we find a practice cottage that represents the so-called average family. The group as a rule consists of the women instructors and the students—occasionally a borrowed baby is included. Data from such a practice cottage are hardly adequate to use in teaching standards in the feeding of the growing boy and the hard working man. Unless the girl comes from a home where she has helped to feed men and boys she has no means of adjusting her standards of quantity to the new conditions which she must face in feeding the more nearly normal group in town, village or country. Her experience is quite likely to be similar to that of one of our students who wrote: "Two weeks ago my tenth grade class served a banquet for our own and a visiting football team. Judging by my brother's appetite I decided it would be wise to prepare a good deal of food, and I was somewhat appalled before we started serving at the quantities I had prepared. However, as they averaged seven rolls and four big potatoes apiece I had nothing left over, and was very glad to come out even!"

The modern marketing studies are largely made from the standpoint of the consumer. We need more studies in cooperative buying on the self-supporting basis so that families may unite in purchasing at lower rates in wholesale amounts. The difficulty with most cooperative buying associations is that they are conducted on a semi-philanthropic basis in that certain members donate their time in the interests of the work; and the result has been that the organization does not survive the zeal of the one who is giving it free time and service. Definite studies should be made so that this means of reducing the cost of feeding the family may be inaugurated in all places where the needs are great. Business methods must be taught by actually carrying on the work of the cooperative organizations.

#### CLOTHING

The tremendous strides in the organization of the textile and clothing industries in this country have led to a very great increase in the purchase of ready-to-wear garments. In former years the workers in the clothing trades were in dire need of protection. The Consumers' League aided in forcing through the needed legislation as to sanitary conditions under which the clothing trade was carried on. Today, thanks to the better organization and the decreased supply of the workers, the wage conditions in the clothing trades are good, with the result that the cost of ready-to-wear clothing has become almost prohibitive to the consumer. Furthermore, reduced pro-

duction on the part of the worker, and the unregulated purchase from jobber to jobber, have increased the cost of raw material beyond all reason. The need for standardization in textiles and for standardization in clothing, in the sense of cost in relation to value of the textile material as clothing, has aroused the federal authorities as well as all of the home economics teachers throughout the country.

Women who are attempting to study thrift in clothing are beginning to ask for standards to aid them in meeting the excessive demands in clothing their families. If we attempt to offer standards of clothing from the point of view of health we find a dearth of scientific data in regard to the effect of clothing on heat retention, on heat conduction and even, in many cases, on the sanitary conditions which should be maintained in keeping the body more nearly in a state of health.

Should we advocate textile fibers or textile processes regardless of the fiber used? Is it a question of nature or of mesh? Is it a question of non-conducting layers of air and, if so, how may these be achieved with the least possible expenditure in the clothing budget? What are the most scientific methods of cleaning clothing so as to maintain the porous or open mesh condition which we advocate under the head of air retention.

Few studies have been made which will aid us in solving these problems. Most of the teaching is done not from the standpoint of health, but in relation to esthetic and economic standards. The economic discussion is based in the main on the division of the income according to Engel's law modified to meet American conditions. The experience of the workers in the munition factories and in other war industries in which wages rapidly increased, showed that when the wage advanced undue expenditures were made for clothing in the sense of accessories rather than of essentials. This means that we have not met the situation far down in the grades, that we have not adequately set forth permanent standards by which our pupils may judge their expenditures. This condition is true not only in America but in every other country where a similar situation has existed.

In our teaching of hygiene in the grades we have dwelt too long upon the use of stimulants and intoxicants and said too little as to essentials in health, among which clothing is an important factor. The expenditure for children in the grades and high schools has increased to such an extent that it is becoming a very serious burden upon the average family. The expenditure for clothing among many college girls has reached a point where it seems almost criminal. The need is apparent for developing health standards and economic standards which can be taught from the lowest grades up to the field work in extension.

Desultory studies have been made by college students in college courses. A few have been made on typical families but most of the data are empirical rather than scientific. A few scientific studies have been made on the comparative economy involved in the use of ready-to-wear clothing. Many of these studies ignore the value of the woman's time and when they do include it they calculate the time on the basis of the lowest wage. An intelligent woman in the clothing trade today in New York City receives a wage far above that of the average instructor in a high school or college. It is, therefore, not fair to rate the home worker on the non-productive basis when she manufactures clothing for the family use from the raw material. In all such comparisons the housewife should be credited with the average wage of

the sewing woman. Only one writer, Leeds, has discussed the household budget from this angle. Most of the writers on economics list the housewife as a non-producer. Teachers of home economics all over the country should be prepared to teach the economic value of the work of the woman in the home. If the cost of production in the home is excessive, then the woman in the home should be trained to use her time to better advantage through the wise expenditure of money in the purchase of ready-to-wear clothing and to utilize her time for such other production as is economically the most worth while.

We need to study in cooperative organizations the buying of the clothing for the family, with a few experiments along the line of buying directly from the manufacturer and of producing in the village or community center under the direction of a woman professionally trained in clothing manufacture. If the milk industry can be put on a cooperative basis, there is no reason why in a village or other country center the clothing industry, the food industry, the laundry industry, might not be put upon a similar cooperative basis.

The studies in the expenditure of human energy and time in the home mending of clothing are very few in number. One manufacturing establishment sent over the country an expert to demonstrate short cuts in methods in use of the sewing machine. This tended to encourage the over-elaboration of clothing instead of short cuts and of time studies in manufacture with special reference to the beauty and wearing quality of the product. When the older and better textile goods were available, studies in the value of alteration of old garments were made with profitable results in respect to the outlay of time and of material. Today, the sophistication of our textile products is such that it is an open question whether it is worth while to alter old garments. Careful mending and use as long as possible is often more economic than to attempt to cut down the material in order to make garments for younger family members. Time and energy are often expended on garments without reference to the value of the mended product. Instruction in the necessary short cuts in mending needs to be developed. The time spent in mending is an interesting item in the farm home studies made this past year by the States Relations Service. In most of the family homes today the woman makes part of the clothing for herself and the children, but none for the men; yet she spends from four to six hours a week in mending. The need for teaching the short cuts in mending and a discussion of when not to mend is apparent, since most of these women in their replies stated that they had little or no free or leisure time.

The esthetic value of the clothing in character development has often been discussed. The moral issues involved are favorite topics in general meetings of men and women, and in special meetings of social workers. In many cases the discussion is based on sentiment rather than on ideals of conduct. Character training and moral standards should have been established long before the adolescent age so that the question of the relation of clothing to the moral standards should be relegated to history. At best, the relation is vague. It lies more in the way that the clothing is worn than in the type of clothing itself. It is a question of the thought in the mind of the observer rather than the cut or texture of the clothing of the wearer that it is important to regulate. We need to teach ideals of conduct

all along the line and when that is done the moral side of the clothing problem will take care of itself.

#### EDUCATION OF THE CHILD

Shall the home economics teacher do her share in the training of the future parents so that they will be more nearly able to meet the problems which will arise in the education of the child in the home? Are they called upon to offer training courses to parents or does that belong to the department of education, of medicine, or of religious training? It is a debatable question in many departments of home economics all over the country. As far as the girls and women are concerned, the home economics teacher often comes more closely in touch with them than does any other teacher. In this she can be not only an assistant but a primary worker in establishing standards for the education of the child in the home. This work should be begun in the home and, therefore, the future parent must be receiving the training somewhere along the line. In view of the short period that the majority of children spend in school the training must be begun in the home and church and continued in the grades. It must be intensified in high school and specific courses offered in normal schools and colleges in the training of teachers of the best type to carry this educational work into the grades and the high schools and out into the extension field work.

The methods of approach and the methods of study have been worked out in only a few institutions. The late Edna Day was a pioneer in advocating the use of the living model in teaching the care of the child. A few instructors are now definitely borrowing children from the state orphanages and establishing them in the home economics practice cottages where their feeding, clothing and, frequently, their habit formation are in the hands of anywhere from a few to a dozen young women. It is a debatable matter, although from the standpoint of the young woman the experience is undoubtedly valuable. From the standpoint of the child the argument is, that coming from a state institution they undoubtedly will get better training in the practice cottage than at the orphanage. Most of us are watching the experiment with much interest. The effect upon the character development of the child of being subjected to the variation of training that comes from passing through the hands of many foster mothers may well be questioned. Many children find it difficult to adjust themselves to a single mother. We are reminded of the small boy who was adopted by a club and ran away. When he was captured and returned he was asked if he had not been well treated. He replied that he did not mind being good in one way but he could not possibly be good in 20 ways. Possibly the instructor in charge of the practice cottage work is the real foster mother and the girls are older sisters, but those of us who have been younger sisters know to how great an extent the result will depend upon the disposition of the sisters. There is no doubt that under ideal conditions the practice cottage should approach as nearly as possible the family group. The adopting of a child by the class may be a move in the right direction, or it may not. The study of the human family in its close relationships can be given best on an impersonal and objective basis, and if the teaching is done from a scientific point of view without emotional stress, its effect will be good. If it is for one moment put on the personal and emotional

basis, there is much danger that it will pass over into sentimentality or a type of hysteria in presentation.

In connection with the tremendous fight which is being waged today by the Government and States to eradicate the worst types of disease there is the added danger of emotionalism and hysteria. A wise teaching in biology, in hygiene and in medicine, as well as in social and economic relations in the family, will tend to clarify the situation. This work should be done in cooperation by the departments of home economics, biology, education and medicine.

#### EXTENSION BULLETINS

Our bulletin literature, which is intended to educate the public, has become so voluminous and so infinite in its variety that the general public is approaching an attitude of indifference toward it. The printed page no longer holds the average reader beyond the first sheet which can be read by the headlines. The daily papers and the "movies" are the main sources of intellectual stimulus. The reading public, in the sense of reading bulletins and books, represents a very small percentage of our population. In spite of this, the home economics worker whose name is on the mailing-list of the Land-Grant Colleges and the Federal Department of Agriculture finds her desk heaped with printed matter of varying quantities and standards. Added to these are the Red Cross publications and bulletins from private or endowed institutions. A comparative study of the standards advocated by these publications discloses utterly irreconcilable variations. It is no wonder that the instructor in grade, high school or college work tends to teach only those things which she has learned in her school training together with such other material as is furnished by state leaders, either the supervisor of the home economics teaching or by the home demonstration worker. The situation is like that of the centipede and the frog:

"The centipede was happy quite,  
Until the frog in fun  
Asked which leg followed which.  
Which wrought her mind to such a pitch  
She lay distracted in the ditch,  
Considering how to run."

#### REMEDIES

It is well understood that it takes five years for a physiological discovery to become a well-known fact, by which time another discovery will have disproved it. Is there no way by which this mass of printed matter may be reduced and unified to a more nearly common standard of teaching? Is it too much to hope that we may control the publication of pseudo-scientific data which is flooding our papers and magazines and is being swallowed by many workers to pass on as factual material to their receptive pupils?

The public is nowadays getting its knowledge of life and language through the moving pictures. This force is teaching so largely through the eye that the printed page is becoming impotent. Should we not capture this new instrument for the educational field? The demonstration has always been popular and the demonstration plus the spoken word of explanation is the most effective method that we can use in our extension work today.

The more nearly the home demonstration approaches the house and living conditions of the audience the more effective is its message. The use of moving pictures in which the more simple and direct labor-saving and time-saving processes are demonstrated with sufficient captions clearly to tell the story, may be our salvation in teaching not only in the grades but in the high schools, normal schools and in the extension services. Some of the most effective films today tell the milk story in a very few words. The fly story has been utilized to show how to prevent the spread of contagion. Once seen, you can not forget this story however much you may desire to do so.

Where the demonstration can not be given in the central community house or in an apartment or home kitchen, moving pictures can be used provided always that they are adapted to the audience. Standards in equipment in the staging of the show are largely lacking and false standards are being taught not only in esthetics but in equipment, in furnishings, in dress and, most of all, in manners. The supervision of the moral side of moving pictures hardly touches the problem. If the Federal Department of Agriculture could develop satisfactory moving pictures adapted to use in various sections they would be much more effective than much of its bulletin output.

A manifolded page, giving the weekly reports and analyses of the latest discoveries, could be sent to a permanent mailing list of teachers and club workers. In this way the data would quickly reach the schools and the general public. It would bear the stamp of authority and should be much more dependable than the average journalistic report which usually is written by people who are experts only in making a subject startling. A very simple summary in connection with such a review would cost but little and would be more effective than the present type of publication.

Carefully studied projects are needed for demonstration in grades, high schools, colleges and extension work. Their free exchange from institutions to the Federal Departments and back to other institutions would simplify and improve the work of teaching. The Home Economics Division of the Federal Department of Agriculture, the Bureau of Education of the Department of the Interior, the Children's Bureau of the Department of Labor and the Health Bureau of the Treasury Department would work as one. There should be a standing central committee representing all of these offices, unifying their messages and eliminating repetition and contradiction. The present Tower of Babel needs to meet its drastic calamity not through confusion of tongues but through a unification of messages.

Living conditions, not only as to the question of the cost of living but as to the solving of labor problems, can be greatly improved if attention is paid to the formation of more cooperative organizations. We have a few cooperative laundries in the country; we need them in every section of the country districts. We need more community bakeries and, if possible, more community kitchens so that the housework problems will be met on the modern industrial basis, so that the housewife will be relieved from much of the time consuming, monotonous routine that approaches the work of a slave. In the country districts this is depopulating the farm home and in the city it is reducing the size of the family below the race maintenance standard. We need cooperative organization in the purchase of

raw and manufactured material, an organization on a basis similar to the Rochdale plan and not an organization maintained at the expense of an unpaid managerial director. We need community play centers, either a community house with play rooms and play grounds, or public schools made into community centers. In every case there should be residential leaders (man and wife) in charge of the community center. The unregulated play instinct of the population has led us too far afield. We need a revival of a simpler and saner type of life in which play will have its legitimate part.

#### HOME ECONOMICS EXPERIMENT STATIONS

From the standpoint of advancing knowledge through wisely directed experiments, we need home economics experiment stations supported in part by federal and in part by state funds, so that the people may feel that they have a personal interest in the experiments that are being carried on to better the home conditions and to make American home life more nearly what it should be in developing future citizens. In these experiment stations conditions should be studied so that definite standards may be formulated for use in the educational work.

#### STATE WELFARE STATIONS

We need state welfare stations where the health and education of the children may be studied. Child welfare bureaus are being started in connection with state boards of health. These are excellent, but there should be in addition research stations, either in connection with the laboratories of our state medical colleges or state hospitals, where under the best conditions of housing, care and medical treatment, children may be brought back more nearly to normality.

We need more intensive studies on the relation of food to mental development. How many of our defective children, under wiser methods of feeding and of training, could be brought more nearly to normal is a question that has hardly been touched upon in experimental work. Only one State (Iowa), through the efforts of its women's clubs, has seen fit to make an adequate legislative appropriation. This work should be watched carefully in other states and Iowa's example followed.

#### PUBLIC SCHOOLS

The lunchroom, the open air room and the restroom have come into our public schools of late. Child welfare clinics should also be established to study not only the child's state of health but also to teach standards in diet and in hygiene so that the future home-maker will understand in the early formative period of life what health means and how it may be achieved through better food, better clothing and better shelter conditions.

#### ECONOMICS

The child needs to be taught the basic factors of the economics of production and expenditure, and that production and consumption in the home can not be measured by the dollar standard but in terms of the health, social life, moral and ethical outlook, and religious development of the members of the family. The return in dollars and cents on an investment is

an easy method of measuring its value, but the home can not be measured by that standard. Therefore, we need to teach from the very beginning of school life the things that make for the ideal American home and to lead our youth to realize that its product is best measured in the worth of the citizens which it has helped to make.

Unification of effort in the business world achieves success; in the educational world it will do likewise. The drive must be an unified drive in which all the agencies through which we teach are united on subject-material and also as to standards.

C. F. LANGWORTHY of Washington. How may one bring cultural and historical background into the scheme?

MISS A. L. MARLATT. The history of the family may serve as a basis on which to establish standards.

C. F. LANGWORTHY. I am glad that a plea was made for more exact expression. Let me illustrate: I have yet to see a clear statement regarding vitamins, as to whether or not they insure growth, as to whether or not the lack of any one type results in a deficiency disease. And so all along the line, there is lack of exact statement.

MISS MAMIE BUNCH. Are we developing here a field or a scheme in which all of the state agencies shall be united?

MISS A. L. MARLATT. There should be a central source larger than the State University. A cut and dried program from the Federal Department is not needed, yet that department should serve as a clearing house.

THE CHAIRMAN. The subject of the next paper "The Place of the General Course in Home Economics," is of especial interest at this time, and will be discussed by Professor Bertha M. Terrill of the University of Vermont.

#### THE PLACE OF THE GENERAL COURSE IN HOME ECONOMICS

BY MISS BERTHA M. TERRILL

I know not to what extent, accident or design controlled our chairman in asking me to present a discussion of the subject assigned me. I am certain that I could hardly have chosen a more congenial topic. What greater challenge to one who experiences increasing appreciation of a background of college work for both classical and literary degrees before taking up the study of home economics than this quotation from her letter: "Is there any longer a place for a general course in home economics? Some think there is not." I could not resist confessing that I was shocked and appalled at the statement, for I had not realized that we had gone so far in our enthusiasm for the work in which we as a group must profoundly believe, but which I sincerely think we can in no way so successfully defeat as by such an attitude. Dare I add without danger of misunderstanding and offense, as a too discourteous champion, that I have been more than once forced to use great restraint not to point out to those berating the arts courses as designed for much waste of time, that the very English in which they contended would seem to prove the value of further lingering within the class rooms where especial language appreciations are obtained.



But let us come to our subject. What is a general course in home economics? I take it that this may be either a course intended for those not definitely decided upon a vocation and therefore wishing to specialize or a course containing the fundamentals of home economics in its various phases without attempting specialization through advanced courses in any one particular phase of the subject. This term may be applied, I should suppose, either to a course in the College of Arts and Sciences with recognized electives in home economics, or to a course leading to a degree in home economics in which the required home economics is of a general nature rather than specialized in food, clothing, institutional management and the like. Defense of a general course seems to me to involve an appreciation of a general admixture of subjects other than home economics and also a sufficiently broad representation of all the phases of home economics as to give a well-rounded acquaintance with its subject-matter rather than a highly specialized grasp of a limited field.

In the first place, we can not afford to lose sight for a moment of the great basic reason for education, by which I believe that every undergraduate course should be carefully tested. This leads to a recognition of the five-fold intellectual inheritance as the most precious of possessions for any human being, and that as surely as we profit by inheriting the experience of others in ways of doing the things to be done in life, so we may acquire invaluable aid in self-direction and service by appropriating the thought life of the past. This inheritance has been helpfully subdivided for us into the five groups called our scientific, literary, esthetic or artistic, institutional and religious inheritances. Recognition of the value of each of these groups is to be found in all past orthodox curricula and an appreciation of the value of each of these gives significance to the chemistry, language, music, history, education, comparative religions, Bible or other ethical courses prescribed as requirements. No one of these groups can be ignored without intellectual crippling, arrested development, a limiting of mental efficiency. The more fully election is made from each and all, the more splendid and rich the equipment. In view of this it seems to me that upon those who have the arrangement of a required course of undergraduate study, rests a grave responsibility to see to it that a student is not allowed to specialize in any of these groups to the exclusion of some knowledge of all of them, the more evenly divided, the better. In this lies the danger of a too free elective system. Of course wide free choice still remains as to the particular science, history, literature, or language a student pursues, in defense of which I should say it remains with the teacher of the first essay into either one of these fields to make the subject-matter so compellingly essential to the student that life hereafter becomes a further search into the varied resources of that group.

Sad as physical defects are, can there be a sadder spectacle or experience than that resulting from intellectual blindness, deafness, or dumbness in an age so appealing for many-sided reactions, so rich in all it offers both of personal appropriation and opportunities to share? Merely from the standpoint of success do we not see at the present time as a result of rash ignoring of these essentials for a well-developed person, pitiful failures not due to lack of specific knowledge but to ill-fitting adjustment through lack of appreciations? It is the most common criticism that I hear, and I believe it an especial danger in vocational training.

But perhaps we are not so far apart in the ideal as it sometimes seems. There still remains the question whether such a general course is possible. Do students, or their parents, want it? Can an institution hold to it as an ideal, divergencies being frankly recognized as necessarily unfortunate compromises in some cases? I believe that it can and should be. Therefore, while entirely endorsing vocational guidance as highly desirable during undergraduate study, I believe very firmly that few undergraduate students are able to decide, at least before senior year, what their happiest selection of a vocation is to be. Perhaps my own five years of teaching Greek before I found myself, colors this conviction, although I recognized present day improvement in vocational guidance.

I believe strongly also in the dwarfing which must result from crystallizing interest in study upon a given subject or group of subjects too early in one's course. An undergraduate student should be an octopus, reaching out hungrily in every possible direction, with the eagerness which gives zest, fostered by not knowing in which direction the richest food supply is coming. This much conceded, I am wholly ready to give place, with all my heart, to a reasonable amount of such applied material as courses in home economics present, believing that if properly presented they quicken interest in and desire for the more abstract material; but I can not believe that undergraduate work in home economics should ever be allowed to become so specialized that, later, teachers of foods shall have no proper conception of clothing or vice versa; and I believe that our departments today are weakened by the presence of some thus wrongly limited.

Now I have not spoken in ignorance of what the actual working conditions for all of this are today. There is intense pressure away from such a course, at a time when young women are needing and seeking highly vocational training as never before, when special funds would limit for specific use all teaching done under their aid. It is no child's problem especially for a small institution with limited facilities to determine what to do. I can only declare that personally my deepest interest and belief is either in the undergraduate course in home economics, offered as a minor elective to students in the College of Arts and Sciences which is made as rich and full of subject-matter as is possible in junior and senior years, or for the general home economics course which gives place to as large recognition of language, English, history, art and general science as possible, with so much of general courses in home economics as will prepare for intelligent home-making, or teaching in a junior-senior high school. The true student will return at her earliest opportunity for graduate work in her chosen field. She will never go back for the general courses.

So strong is my conviction that when the test came, I insisted that for our institution such a course must stand, whether acceptable for special purposes or not; and no modification has been made except the introduction of a course in special methods. This, with two possible electives, has fortunately been sufficient to make our course acceptable to state and federal authorities for all that is asked of it at present in our undergraduate courses.

I was greatly encouraged last year to find that I was not wholly out run and that the possibility of this sort of home economics instruction is still with us. On being asked by those interested in the introduction of the study into the curriculum of one of the leading colleges in the Middle West,

whether I could suggest a teacher with this point of view, I was assured that the seeming lack of such was a chief deterrent in the introduction of the work. That that college is not yet provided for makes me fear that the variety is growing too rare. Those of us who were so fortunate as to work under and with Mrs. Richards appreciate her ideals and consider earnestly our obligation to continue the respect which she created for the study by virtue of her own broad training and interests and the vision she had for the work.

A. VIVIAN. I agree that in every university there should be offered a course in home economics for election by women students in arts, for the reason that every such student should receive something of value beyond completing the four years of arts work, and because at least a small amount of this training is needed by every one who expects to take charge of a home.

MRS. HENRIETTA CALVIN of the United States Bureau of Education. Miss Terrill's idea of a general course meets the approval of teachers in general. A short time ago a supervisor expressed to me her preference for teachers who had graduated from general courses to those whose training has been along highly specialized lines. I believe in training specialists at our colleges, but so far as possible it were well for them to have received the benefit of a general college course prior to their specialization.

MISS EDNA N. WHITE. Some of you will recall Doctor True's endorsement of the plan providing first for the general course and then for opportunity for specialization.

THE CHAIRMAN. Because of some misunderstanding it is necessary to continue the discussion of Vocational Education through the two sessions. Miss Mildred Weigley of the University of Minnesota, will now talk on "Vocational Experience."

#### VOCATIONAL EXPERIENCE

BY MISS MILDRED WEIGLEY

Vocational experience is about as specifically defined today as is the illustrious "home project." As with the home project, so with vocational experience, we are conscious of its need, thoughtful of its purpose and hazy as to its character and means of development. I can consider my only justification for discussing the subject the fact that I can probably ask as many questions as any one else.

We can not help but be cognizant, however, of the fact that as the attempt is made to put teachers into the field of vocational home-making as students go into their own homes, state supervisors, follow-up instructors and the students themselves tell us that the latter lack in their training, vocational contact or experience. It is on this account that I purpose at this time not to dilate on the subject but merely to develop some points which may lead us into discussion and eventually to some agreement.

There are three general phases of the problem with which we shall be called upon to work. Obviously first is the definition of what we mean by vocational experience. Are vocational experience and vocational contact synonymous? What lines of work in vocational home-making require voca-

tional experience? What shall constitute vocational experience? Shall it be simply further repetition of processes and problems already carried out through regular class work—if so what processes or problems require this repetition? Or is the vocational contact to be of a general nature, such for instance as would be secured by work in a home before entrance to college with no clear objective on the part of the student?

These are a few of the questions we shall have to answer before we shall know definitely what we mean by vocational experience.

Having determined what is the general nature of vocational experience—and this it seems to me should not be a hard task—the most difficult problem then confronts us. How are we to know that the vocational experience which we are demanding of our students is adequate? This raises the whole problem of standards of achievement.

For some time we have had clearly stated achievement standards for some lines of vocational experience as, for example, preparation of food. I have in mind such a plan as we use in the home management houses at Minnesota and which I know is used in other places where we insist that each student reach a certain point of skill in the preparation of a few fundamental dishes. We capitalize the routine work that must be carried on. Some fairly clear standards are established in vocational experience in clothing construction but there is a vast field of work for those who take it upon themselves to designate achievement points along the various lines of vocational experience.

I understand that there is a committee working upon this problem. Its finding will be of great interest to all of us if they can be carried to the point of actually getting together some end points toward which we are working.

With the nature of vocational experience to be given agreed upon, with standards of achievement set up, we shall still be confronted with certain administrative problems which must be settled.

At what point in the course shall vocational experience be required? Of whom shall it be required? How much time shall it demand? This is of importance because any one working with an already crowded curriculum which embraces as it does the full time of the student knows that something is added only when something is taken out. To what extent is a requirement of two years of vocational experience justified, making a five-year course?

It is clear that the questions raised around these three problems—the nature of vocational experience, standards for its achievement and its administration—need careful consideration. I believe we shall not be able to answer the first question, and hence, obviously, not the others unless we analyze the contents of our present curricula and courses with respect to the needs for vocational experience and the opportunities for vocational experience already afforded.

THE CHAIRMAN. May there be discussion as to the kind and amount of vocational experience that is desirable?

MISS ANNA RICHARDSON of the Federal Board for Vocational Education. The need of vocational experience as a part of general training should be stressed because of the home-making perspective it gives. There

is need of teachers who will give the home-making point of view. There is no better way to secure this point of view than to live in a home.

MISS EDNA N. WHITE. How shall we measure adequate home-training experience?

MISS MILDRED WEIGLEY. Another difficulty is presented in that there is no provision for comparison between groups before and after entering college.

MISS LOUISE STANLEY. Is not industrial experience desirable, both from the point of view contributed and for the fact that it affords experience of a vocational nature? While it may be attained along other lines than in home-making, perhaps in a cafeteria or in the millinery trade, notwithstanding, is it not the vocational experience thus secured of great value?

MISS MILDRED WEIGLEY. What may we consider to be vocational experience? What are the special lines along which we want our students to secure vocational experience?

MISS KATHERINE JENSEN. We are planning in North Dakota to employ a woman to carry on two lines of work, namely, follow-up work with the teachers who are engaged in domestic science work in the Smith-Hughes high schools, and, supervision of the young women who are getting their vocational experience in the home. If a young woman is so situated that she can not secure such experience in her own home, she must go into somebody else's home and carry on the different lines of home-making under the general direction of this supervisor. Every young woman who is enrolled in our teachers' training work must get part of her vocational experience under direct supervision. Since the number of young women we graduate each year is limited, we feel this plan is feasible. Of course it will be necessary for the supervisor to travel all over the State to get to the homes in which the college girls are located.

MRS. H. W. CALVIN. If the college knows short cuts it scarcely seems necessary that every girl enter upon a trade in order to secure her vocational experience.

MISS ANNA RICHARDSON. There is apparent confusion in the use of the terms "vocational experience," "follow-up work," and "training in the field by the supervisor." Vocational experience in home-making must be resolved into its specific parts. Its value may not be expressed in terms of a commercial undertaking, but as a measure of satisfactory experience. There are so few measures of what is successful home-making which is really a composite occupation.

MISS MILDRED WEIGLEY. Throughout the four years there must obviously be the composite experience but the standards are separately arrived at.

MISS EDNA N. WHITE. If a young women has had practical home-making experience prior to entering the courses what recognition should be given to that fact?

MISS MILDRED WEIGLEY. Some means should be taken this afternoon either through a committee appointed to that end, or otherwise, whereby acceptable definitions of the points in questions may be arrived at.

MISS CORA WINCHELL of Columbia. The state supervisors of home economics will be assembled at a vocational conference in February. Such definitions can logically be formulated at that meeting.

MISS ANNA RICHARDSON. What is regarded as the minimum requirement for residence in a practice house?

MISS MILDRED WEIGLEY. It appears to vary from one to 12 weeks.

MISS EDNA N. WHITE. May I present the following resolution:

*"Resolved:* That it is the sense of the Division of Home Economics of the Section on College Work and Administration that if federal or state appropriations be made in behalf of extension work in agriculture and home economics at any Land-Grant College, it should be stipulated in the enactment that one-half of the entire appropriation should be devoted to extension work in the interests of women and girls."

On motion, the resolution was passed and referred to the Executive Committee.

THE CHAIRMAN. Miss Edna N. White of the Ohio State University, who we are proud to say is president of the American Home Economics Association, will now report on "The Status of Home Economics Legislation."

#### THE LEGISLATIVE PROGRAM OF THE AMERICAN HOME ECONOMICS ASSOCIATION

By MISS EDNA N. WHITE

In view of the increasing interest in promoting home economics education through legislative enactments, the American Home Economics Association at its annual meeting at Blue Ridge, N. C., decided to enlarge the legislative committee and extend its activities by developing state organizations.

A representative of the Association has been appointed in each state whose duty is to organize the women in order to keep them informed of proposed or needed measures affecting home economics interests. It will be the duty of this chairman to see to it that such measures are presented and explained to the congressmen of her state together with a statement of the attitude of the women. It is hoped that all the various women's organizations will be kept informed regarding such legislation as it affects them and their support obtained. It is expected that each member of the Association will get in touch with her state chairman and offer her services in furthering the legislative program.

At the present time there is before the Senate a bill introduced by Senator Reed Smoot providing a small fund for each state for research in home economics. The value of such state appropriation for research has been satisfactorily demonstrated in the case of agriculture. The Smoot bill should receive the unanimous endorsement and active support of every woman interested in progress in home-making.

Another bill which is being considered at the present time provides for cooperation with the States in the promotion of vocational education in home economics and appropriates funds for that purpose. This bill has been submitted to various state departments of vocational education and has been revised in light of the suggestions which have been received. It is expected that this bill will be introduced at an early date and will also need the active support of the committee.

It is unnecessary to repeat here the arguments for this bill. They were given in detail in the article which appeared in the June number of the American Home Economics Association Journal. They may be summarized briefly as follows:

1. Administration of home economics unhampered by the rules established in the interests of its trades and industry.
2. Better financial support for home economics education.
3. Distribution of funds for home economics on the basis of total population rather than upon the basis of urban population.
4. Need of increased funds for administration and research in home economics.

The texts of the Smoot bill (S. 2380) and of the proposed measure looking towards the promotion of home economics vocational education are as follows:

#### S. 2380

#### A BILL TO PROVIDE FOR AN INCREASED ANNUAL APPROPRIATION FOR AGRICULTURAL EXPERIMENT STATIONS, TO BE USED IN RESEARCHES AND EXPERIMENTS IN HOME ECONOMICS, AND REGULATING THE EXPENDITURE THEREOF.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:*

That there shall be, and hereby is, permanently appropriated out of any money in the Treasury not otherwise appropriated to be paid as hereinafter provided, annually to each State and Territory for the more complete endowment and maintenance of agricultural experiment stations now established or which may hereafter be established in accordance with an Act of Congress approved March 2, 1887 (Twenty-fourth Statutes at Large, page 440), and Acts supplementary thereto, except that in States in which the experiment station established under said Act did not on July 1, 1919, have a department for the investigation of home economics, the beneficiary of this Act shall be that institution which is now receiving the benefits of an Act approved May 8, 1914, to provide for cooperative extension work in agriculture and home economics, the sum of \$2,500 in addition to the sums named in said Acts, beginning with the fiscal year ending June 30, 1917, to be applied only to paying the necessary expenses of conducting original or confirmatory researches and experiments bearing directly on home economics, including both domestic science and domestic art, and printing and disseminating the results of said researches or experiments, having due regard to the varying conditions and needs of the respective States and Territories.

Sec. 2. That for the purposes specified in section 1 of this Act there are also appropriated, to be paid, as hereinafter provided, to each State and Territory an additional sum of \$2,500 for the fiscal year ending June 30, 1918, and an additional sum of \$5,000 for the fiscal year ending June 30, 1919, and an additional sum of \$7,500 for each fiscal year thereafter. No payment, out of the sums appropriated by this section, shall be made in any year to any State or Territory until a sum equal to that appropriated by this section for each State and Territory has been appropriated by its legislature, or has been otherwise made available for that year by State, county, experiment station, or local authority for maintenance of cooperative research work and experiments under this Act. Any sum appropriated by this section for any fiscal year, which remains unpaid at the close thereof on account of the failure of any State to provide an equal sum, shall remain available and may be paid to such State, upon compliance with the provisions of this Act, at any time up to the adjournment of the first regular session of the legislature of the State or Territory meeting next following the date this Act becomes effective.

Sec. 3. That cooperative research work and experiments shall be carried on in such manner as may be mutually agreed upon by the Secretary of Agriculture and the State or territorial experiment stations receiving the benefits of this Act. No part of the funds appropriated by any provision of this Act shall be paid to

any State or Territory for any fiscal year until the officials of each experiment station of that State shall have submitted, and the Secretary of Agriculture shall have approved, the plans for the work for that year to be carried on under this Act. The sums paid over shall be used only for the purposes specified in this Act. Bulletins or reports of progress, giving the results of researches or experiments in home economics, shall be published by said stations from time to time, and shall be distributed free of charge in accordance with such plans as the Secretary of Agriculture and the experiment stations may agree upon.

Sec. 4. That payments under this Act shall be made quarterly, in equal amounts, on the 1st day of January, April, July, and October of each year by the Secretary of the Treasury, upon the warrant of the Secretary of Agriculture, to the treasurer or other officer duly appointed by the governing boards of the experiment stations to receive the same. Such officers shall report to the Secretary of Agriculture, on or before the 1st day of September of each year, a detailed statement of amounts so received and of their disbursement, on schedules prescribed by the Secretary of Agriculture. The grants of money authorized by this Act are made subject to legislative assent of the several States and Territories to the purposes of said grants: Provided, That payment of such installments of the appropriations herein made as shall become due to any State or Territory before the adjournment of the regular sessions of the legislature meeting next after the date this Act becomes effective shall be, upon the assent of the governor thereof, duly certified to the Secretary of the Treasury.

Sec. 5. That if any portion of the moneys received by the designated officer in any State or Territory, under the provisions of this Act, shall by any action or contingency be diminished or lost or be misapplied it shall be replaced by the State or Territory to which it belongs, and until so replaced no subsequent appropriation shall be apportioned or paid to such State. No portion of said moneys shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation, or repair of any building or buildings, or to the purchase or rental of land, or to the compensation of any person engaged during the same period in the performance of any duties other than conducting researches or experiments bearing directly on home economics, or printing and disseminating the results thereof. It shall be the duty of each station annually, on or before the 1st day of February, to make to the governor of the State or Territory in which it is located a full and detailed report of its operations under this Act, including a statement of receipts and expenditures, on forms prescribed by the Secretary of Agriculture. A copy of such report shall be sent to each of the other of said stations, to the Secretary of Agriculture, and to the Secretary of the Treasury of the United States. No further payment shall be made to any State or Territory which refuses, upon the request of the Secretary of Agriculture, to submit to him satisfactory evidence of the expenditure, in compliance with and for the purposes prescribed by this Act, of the moneys theretofore paid to the State or Territory under this Act, or which refuses to submit to such examination of its expenditure and the books, vouchers, and documents relating thereto as the Secretary of Agriculture may require.

Sec. 6. That on or before the 1st day of July in each year after the passage of this Act, the Secretary of Agriculture shall ascertain and certify to the Secretary of the Treasury whether each State is complying with the provisions of this Act and is entitled to receive its share of the appropriation for the fiscal year under this Act. If the Secretary of Agriculture shall withhold a certificate from any State, the facts and reasons therefor shall be reported to the President and the amount involved shall be kept separate in the Treasury until the close of the next Congress in order that the State may, if it shall so desire, appeal to Congress from the determination of the Secretary of Agriculture, and if the next Congress shall not direct such sum to be paid, it shall be covered into the Treasury: Provided, That nothing contained in this section shall prevent any sum unpaid on account of the failure of any State or Territory to provide an equal sum from remaining available up to the adjournment of the first regular session of the legislature of the State meeting next following the date this Act becomes effective, in accordance with section 2 of this Act.

Sec. 7. That the Secretary of Agriculture shall make an annual report to the Congress of the receipts and expenditures and work of the agricultural experiment stations in all of the States and Territories under this Act and also whether the appropriation of any States has been withheld, and if so, the reason therefor.

Sec. 8. That Congress may at any time amend, suspend, or repeal any or all of the provisions of this Act.

# **A BILL TO PROVIDE FOR COOPERATION WITH THE STATES IN THE PROMOTION OF VOCATIONAL EDUCATION IN HOME ECONOMICS AND TO APPROPRIATE MONEY AND REGULATE ITS EXPENDITURE.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:*

That there is hereby annually appropriated out of any money in the Treasury not otherwise appropriated the sums provided in Section 2 of this act to be paid to the respective States for the purpose of cooperating with the States in paying the salaries of teachers, supervisors and directors of home economics subjects, and the sum provided in Section 3 for the use of the Federal Board for



Vocational Education for the administration of this act and for the purpose of making studies, investigations and reports to aid in the organization and conduct of vocational home economics education, which sums shall be expended as hereinafter provided.

Section 2. That for the purpose of cooperating with the States in paying the salaries of teachers, supervisors or directors of home economics subjects, there is hereby appropriated for the use of the use of the States, subject to the provisions of this act, for the fiscal year ending June 30, 1920, the sum of \$500,000 and annually thereafter for nine years an amount for each year equal to the amount appropriated for the year preceding increased by \$250,000, and for the fiscal year ending June 30, 1930, and annually thereafter the sum of \$3,000,000; such appropriations to be paid to the States in the same manner and upon the same terms and conditions, except as hereinafter provided, as the funds now provided by the Vocational Education Act, approved February 23, 1917, for cooperation with the States in the payment of the salaries of teachers of home economics subjects, and to be in lieu of said funds; the acceptance of any State of the benefits of said Vocational Education Act being deemed an acceptance of the benefits of this Act and entitling such State, upon compliance with the terms and conditions contained in this act and in said Vocational Education Act, to its allotment of the appropriations as herein provided. That the appropriations hereby made shall be allotted to the States in the proportions which their population bears to the total population of the United States, not including outlying possessions, according to the preceding United States census, providing that the allotment of funds to any State shall be not less than a minimum of \$5,000 for any fiscal year prior to and including the fiscal year ending June 30, 1925, nor less than \$10,000 for any fiscal year thereafter. And there is hereby annually appropriated the sum of \$50,000 or so much thereof as may be necessary, which shall be used for the purpose of providing the minimum allotment to the States provided for in this section.

Section 3. That there is hereby appropriated to the Federal Board for Vocational Education the sum of \$75,000 annually for the purpose of making, or cooperating in making, studies, investigations, and reports to aid in the organization and conduct of vocational home economics education and for administrative expenses incident to performing the duties imposed by this act and the Vocational Education Act in so far as the same relates to vocational home economics education, including salaries of such employees in the District of Columbia or elsewhere as the Board may deem necessary, actual traveling and other necessary expenses incurred by the members of the Board and by its employees under its order, including attendance at meetings of educational associations and other organizations, rent and equipment of quarters in the District of Columbia and elsewhere, purchase of books of reference, law books and periodicals, stationery, typewriters and exchange thereof, miscellaneous supplies, postage on foreign mail and all other necessary expenses.

Section 4. That in order for any State to secure the benefits of the appropriations provided by Section 2 of this act, the State Board for Vocational Education of the State, created or designated in accordance with the provisions of the Vocational Education Act shall prepare plans showing the kinds of home economics education for which it is proposed that the appropriation shall be used; such plans shall be submitted by the State Board to the Federal Board for Vocational Education and if the Federal Board finds the same to be in conformity with the provisions and purposes of the Vocational Education Act and this act, the same shall be approved; that any State may use the appropriations or any part thereof allotted to it under the provisions of this act for the salaries of teachers of home economics subjects in schools or classes or for the salaries of supervisors or directors of the same; that in order to receive the benefits of the appropriations of this act the State Board of any State shall provide in its plan for home economics education that such education shall be conducted in schools or classes which are under public supervision or control; that the controlling purpose of such education shall be to fit for useful employment in the home or other occupation in the field of home economics; that such education shall be of less than college grade and be designed to meet the needs of persons over fourteen years of age who have entered upon or are preparing to enter upon the work of the home or other occupation in the field of home economics; that at least one-third of the sum appropriated to any State under this act if expended, shall be expended for the salaries of teachers in evening or part-time classes especially designed for those who have already entered upon employment, and that the teachers, supervisors, and directors shall have at least the minimum qualifications for teachers, supervisors, or directors determined upon for such State by the State Board with the approval of the Federal Board for Vocational Education. The provisions of this Section shall be in lieu of the provisions of Section 11 of the Vocational Education Act in so far as the same relate to home economics.

**THE CHAIRMAN.** The Chair appoints Professors Isabel Bevier, Laura Neale and Ava Milam, as nominating committee.

The report of the committee on plans and policies will be submitted by its chairman, Prof. Isabel Bevier of the University of Illinois.

**MISS ISABEL BEVIER.** Your committee suggests as to the proposed policy for the home economics division:

1. Such shaping of the general program as may tend to avoid conflicts between the meetings of the home economics division and the extension section.

2. Discussion of administrative policies, in so far as policy is determined by the home economics department and not by the college administration.

3. Home economics in regard to legislation (Smith-Hughes Act, Smoot bill, etc.).

4. Home economics in its relation to the National Education Association, the Dietetics Association, the Public Health Association, etc.

Respectfully submitted,

EDNA N. WHITE,  
ALICE M. LOOMIS,  
ISABEL BEVIER.

On motion, the report of the committee was received.

On motion, a recess was taken until 2 P. M., Thursday, November 13.

#### AFTERNOON SESSION, THURSDAY, NOVEMBER 13, 1919.

The Division was called to order by the chairman at 1.30 P. M.

**THE CHAIRMAN.** The discussion of Vocational Education begun in yesterday's session will now be resumed, led by Miss Alice M. Loomis, State Supervisor of Home Economics in Nebraska.

#### THE RELATIONSHIP OF THE TRAINING OF TEACHERS OF HOME ECONOMICS IN LAND-GRANT COLLEGES TO THE STATE SUPERVISION OF HOME ECONOMICS UNDER THE VOCATIONAL ACTS

By Miss Alice M. Loomis

This relationship deserves consideration since supervision and the training of teachers are the two largest factors in the success of any state program of vocational education. On the one hand the preparation of teachers of home economics for secondary and other schools has for many years been the work of the Land-Grant Colleges; in fact, these institutions have been in many states almost the only institutions doing this work. On the other hand the Federal Vocational Education Act has led to the creation of the position of state supervisor of home economics education, as a member of the staff of the State Board of Vocational Education, which board has the responsibility of carrying out the provisions of the vocational acts.

Before discussing the relationship of the work of supervision of home economics under the state board to the training of teachers for this field by the college, it may be well to review the function and organization of the state board showing the responsibility of the supervisor and to note also the essential points in the organization of home economics education in the college bearing upon the training of teachers.

There is a State Board of Vocational Education in each state charged with the duty of cooperating with the Federal Board in the promotion of vocational education and of disbursing federal and state funds for certain specific purposes. In order to carry on this work state boards have created staffs, the members of which are their representatives. We may omit in

this consideration the type of organization of the staff of a state board in a place where a temporary arrangement has been made, such as the borrowing of an official on part time, and give our attention to the scheme of organization wherein a supervisory staff is employed, paid and directed by the state board.

Although no particular scheme of administration and supervision was required of the States by the Federal Board, this board suggested a plan which had been found by experience to be adequate for the work to be done, and this plan was quite widely adopted. In this system the directional duties are centered in a state director of vocational education who is assisted by supervisors of agricultural, of home economics and of trade and industrial education. A supervisor of teacher-training may also be employed. The state supervisors work under the direction of the state director in accordance with state and federal plans and are charged with the responsibility of promoting, organizing and inspecting all work in their respective fields which may be done under the vocational acts.

The duties of the supervisor of home economics include assisting the director in her special field, studying conditions in the State, aiding in the establishment of schools and classes, assisting teachers in these schools, that is to say, improvement of teachers in service, and inspecting all schools and classes where state and federal funds are spent in her special field. In her promotion of home-making education she will need to study her state and its various communities very thoroughly, and she will need to make contacts with a variety of officials in an attempt to develop the type of schools and the curricula which will be most effective in each place. The day schools may be of the elementary or high school type. In the latter case she must work out courses of study in connection with the inspector of high schools and possibly with the normal training representative in the state department. In the part-time schools she will work in close harmony with the supervisor of trade and industrial education. In the evening classes her program will be modified by contact with the Smith-Lever representative, the Americanization director and other agencies fostering home-making education for adult women.

A clear statement of the duties of a system of state administration of vocational education and of the functions of a state supervisor is made in part I of bulletin 26 of the Federal Board for Vocational Education, entitled "Some Problems in State Supervision of Agricultural Education."

A state board may make provisions for the training of vocational teachers in several ways. The staff of the board may itself carry on this work. There may be appointed a state supervisor of teacher-training who may carry on the work directly or through institutions. Certain institutions may be designated to carry out a plan of teacher-training which has been agreed upon by the state board and the institution.

Inasmuch as Land-Grant Colleges have been very generally designated for this work and as this is a session of a division of the Association of American Agricultural Colleges and Experiment Stations, this discussion is limited to the relation that may exist between state supervisors and the training of teachers in the colleges.

The organization of the home economics and educational sections in the colleges affects the relationship of teacher-training to supervision and hence is of interest here. A discussion of what this organization within

the college should be does not belong here. The results of a satisfactory organization are as follows:

1. There will be a clearly developed plan for the training of teachers. This plan will be adequate for the needs of a state and elastic enough to meet newly recognized needs. The responsibility for this plan will be centered in one individual who is in close contact with the supervisor.

2. The conception of the scope, of the purpose and of the problems in home-making education in the institution will prepare the student to fit harmoniously and effectively into the state system.

3. The program for the preparation of teachers of vocational home economics will have been arranged in view of the needs of the teachers and not of the members of other professions for which the home economics courses are preparing students.

This program for training teachers of home economics education has been well set forth in bulletin 28 of the Federal Board for Vocational Education, entitled "Home Economics Education, Organization and Administration." This program includes vocational experience, unless this has been required for entrance, and studies from four groups; general subjects needed in the well-rounded education of any individual, technical subjects giving instruction in all the occupations of the home-maker, related sciences and art which should have a large part in giving meaning to the technical instruction, and professional subjects having the aim of preparation for teaching.

More consideration than can be given here is needed for these three essentials in the organization of the home economics work in the Land-Grant Colleges which will make possible a satisfactory working relationship between the supervisor and the teacher trainer: A plan adequate to meet changing state needs with responsibility centered in one person, a harmony of viewpoint regarding home-making education within the various sections of the college itself and with the home economics division of the state board, and a course of study developed for the preparation of teachers and for no other dissimilar purpose. These three points deserve consideration not only in states where Land-Grant Colleges are the only institutions designated for training teachers, but also in states where the state board has designated more than one institution for the purpose.

When the duty of the state board to supply supervision for its work was first recognized, the work of supervising schools and classes in home-making and the preparation of teachers for these schools were in many cases assigned to one person. A question at once arose as to the relative desirability of centering in one person the responsibility for the tasks of supervision and of teacher-training, or of dividing this work between two individuals.

Although there are many dissimilarities between agricultural and home economics education, the fact that these two fields of vocational education are both administered by the vocational act will justify us in turning to the experience in agricultural education for the development of a policy in home economics education.

The advantages of each of these two bases for the relationship of supervision of vocational work in agriculture and the preparation of instructors in this field are discussed in part II of the bulletin previously referred to, No. 26, Federal Board for Vocational Education—"Some Problems in

State Supervision of Agricultural Education." If this discussion were written now, without doubt a number of the arguments advanced in this article would be withdrawn and others would be submitted; but the conclusion would probably be the same.

A similar conclusion regarding a desirable relationship of the two phases of home economics education has been accepted by a majority of the people who have had an opportunity to judge of the results of the two systems. The author of this article concluded that the plan of placing supervision and the training of teachers on a coordinate basis "will ultimately show greater strength as measured by the results accomplished in the teaching of vocational agriculture." The author continues:

"When the two functions are placed on essentially coordinate bases and are vested in different individuals, a broader point of view is brought to the problems providing the proper cooperation exists between those who are responsible for the training of teachers and those who are charged with the duty of supervising the instruction in the schools. The cooperation is not difficult to secure when the men (human beings) occupying them are big enough and reasonable enough to be in positions of such responsibility."

It is obvious that with two strong individuals working coordinately on a state program the success of their work is entirely dependent upon a similarity of purposes and of ideals, upon very frank, frequent and full discussions of the means of accomplishing these purposes and upon cordial personal relations and mutual respect.

What then shall be the working relationship of a supervisor of home economics education as the representative of the state board and the person in charge of teacher-training in the college when this institution has undertaken the preparation of teachers according to a specified plan? What assistance in her state work may the supervisor expect to receive from this institution? What assistance should the institution receive from the supervisor? What work can best be done by the representatives of the state board and of the agricultural college working together? The supervisor may expect assistance, from the technical institution along three lines at least: (1) the preparation of teachers for schools and classes in home-making, (2) suggestions for planning courses of study and the preparation of syllabi, lists of references and of educational exhibits, lists and reviews of text-books and other technical material, and (3) cooperation as needed to improve teachers in the service.

At present four groups of vocational teachers are needed in home economics schools: teachers of home economics in day schools, of related subjects usually in day schools and of various home-making topics in part-time and in evening classes.

Little experience has been gained in preparing teachers of home-making in part-time and evening classes, and there is a belief that this preparation can be best accomplished outside of any institution. Even if the preparation of these teachers is undertaken by the state board independently of the college or by a representative of the college working outside of his institution, it will strengthen the professional preparation of home economics teachers in day schools if courses preparing these teachers give at least some attention to the problems of home-making education in part-time and evening classes.

The preparation of teachers of related sciences and art is extremely

important, especially in those states in which vocational home economics is being introduced into the regular high schools, and these states are in general those in which the agricultural colleges have led the way in home economics education. There are indications that the success of vocational home economics in the regular high school depends upon the development of sane courses in related subjects and upon the preparation of teachers for these subjects. Wherever related subjects are a part of the vocational program teachers must be prepared for the work, and home economics departments of agricultural colleges at the present time occupy the strategic position for giving this training.

The technical institution preparing teachers of a subject is in a position to furnish assistance along technical lines to the teachers of the State. There is no need to discuss the value of the college assisting in the preparation of outlines, syllabi and other technical material, and in the planning of courses of study and the content of vocational subjects. The supervisor will suggest the general type and form of technical material needed by the vocational teachers and will supply information regarding state conditions that must be considered in the preparation of it.

It is obvious that the students and teachers in the institution preparing this material and studying these problems must have facilities for becoming acquainted, at first hand with the schools and classes for which the work is being done. Fortunately, traveling expenses for this work are a legitimate item in the maintenance of teacher-training under the vocational act. Whether such provision is made in any state depends, however, upon the budget prepared by the state director. There might be an advantage in the preparation of a tentative home economics teacher-training budget by the state supervisor and the person in charge of teacher-training for submission to the state director.

While the improvement of teachers in service is a duty of the state board, and an important part of the supervisor's contact with each teacher, a portion of this work may well be delegated to the teacher-training institution. There may need to be a clear definition of respective fields where institutions have been doing follow-up work with their graduates which duplicates the work of the state board with the teachers in the schools under its control.

The limited time for this discussion prevents any thorough consideration of the possibilities in the training of teachers in service. Only the major considerations may be touched on. Whenever any part of this work is delegated to the institution preparing teachers it should be carried on from two standpoints: (1) carrying further the preparation which has been begun in residence; (2) gaining an insight in the field that will react upon the resident training.

From the first standpoint it has been advised that the institution in charge of the preparation of teachers follow these teachers into the schools during a set period, possibly one year. Inasmuch as the time which may be spared from residence teacher-training is usually limited and inasmuch as this field work in the training of teachers is being carried on not only to improve the individual teacher, but to improve the system of training teachers, it would seem advisable to divide the time available for this type of instruction between visiting a number of the recent graduates of this and other institutions and a study of general problems which can only be

made in the field. For instance, it may be decided that the teacher-training institution will be able to work with 12 teachers in the field. A number of these to be visited, selected by conference between the supervisor and the teacher trainer, should be graduates of the past year, those being selected not only who have a special need and reflect general weakness in the program of preparation, but also those who have unusual strength and who may be helped in the development of new work. Recent graduates from other institutions should also be visited for various reasons. The remainder of the 12 teachers would be selected because in their particular schools there are general problems, the study of which by the teacher-trainer will be not only of advantage to the state program of vocational home-making, but also to the scheme of preparing teachers for this program. Equipment problems and the hot lunch in the consolidated schools are examples of such questions needing detailed study.

Wherever possible the first visit to these schools should be made by the supervisor and the teacher trainer together, and the supervisor should explain to the superintendent the purposes of the visitation by the member of the teacher-training institution. It should be clearly understood by all that no problems of administration will be handled by the person representing the training institution.

Thus it is seen that the college receiving federal and state funds for vocational home economics may make returns along at least these three lines; the preparation of one or more of the various classes of instructors needed in the home-making schools, the preparation of technical material for the use of teachers and assistance in the improvement of the standards of instruction in the schools.

This discussion has suggested the answer to the question of what assistance the supervisor can give to the college in its accomplishment of the work delegated to it by the state board. The college should receive not only reports of the relative weaknesses and strength of the various portions of the preparation of the teacher, but it should also receive suggestions for the modification of the college course in accordance with these findings. This work, however, is largely remedial. The supervisor should make sure that the college has an opportunity for constructive work in the State. She may do this by bringing to the college field problems, the solution of which will be of equal value in the preparation of teachers and in the promotion of the state program.

An example of such a problem is the relation of a course in vocational home economics in the last year of the junior high school to previous non-vocational home economics instruction in the junior high school, and to the vocational home economics courses in the senior high school. Such a problem starts with a study of the girls of school age in the community who are outside the school and of the school mortality. It may end with a provisional home economics course adapted to the students in the junior and senior high schools. It may lead to the establishment of part-time and evening classes. It may also lead to the question of the recognition by the college of high school work in home economics.

A number of means for furthering a cooperative or conference relationship between the state supervisor and the teacher trainer have been mentioned. Time permits the addition of only a few other suggestions. In every possible way teachers in the field, and prospective teachers in the

college should become acquainted with the supervisory and teacher-training officials in their respective capacities. The teacher-training staff should be represented in all sectional, state and other conferences of vocational home economics teachers, and some of these conferences should doubtless be held at the teacher-training institution in order that the teachers in the State can get a clearer idea of the assistance available from this source.

The supervisor should present state problems, conditions and plans to the students preparing to enter the schools and, if possible, should know these prospective teachers personally. Teacher placement, the recruiting of people both within and without the college who can be developed into strong teachers, broadening and remaking the content of courses, the study of new educational theories and practices affecting home-making education, the giving of appropriate summer school courses for teachers—all these are fields in which the best results can be obtained only when there is cordial and constant cooperation between the supervisor and teacher trainer.

The coordinate status of supervision and the training of teachers is believed to be justified by its results in the state work. Such a relationship will be successful only when two well-trained individuals accept common goals and principles of education and agree in a cordial cooperative spirit to work toward the common end, each one respecting the exclusive field of the other, and giving to the other all the assistance possible from her particular experiences. To make this relationship successful there is needed a fine type of educator and of human being and a firm belief that principles and goals are larger than devices, and that the best interest of home-making education will be served by contributions from different angles.

**THE CHAIRMAN.** May I state the Texas plan? In Texas, the state superintendent has appointed a state home economics committee, made up of the director of home economics and director of teacher-training in the teacher-training institutions, with the addition of two high school teachers of home economics and the director of home economics extension work at the Land-Grant College. This committee meets on call and formulates plans and policies for home economics work in Texas. It acts as an advisory committee to the directors of home economics education in the state department. This creates a splendid spirit of cooperation between all home economics workers in Texas.

**MISS MILDRED WEIGLEY.** The head of a teacher-training institution ought to observe the work of others than her own graduates. May not such opportunities be secured through the supervisor of home economics? How generally and definitely is the principle of follow-up work with graduates to be carried out?

**MISS A. L. MARLATT.** That can not be definitely stated, but it should be done as a rule for as long a time as it seems necessary. Other questions that arise are: How far should those in charge of follow-up and of supervisory work work together? Should the teacher in the field be judged by the supervisor or her former instructor?

**MISS ALICE M. LOOMIS.** It would be highly desirable if both the person in charge of the follow-up work and the supervisor could visit the vocational schools.



MISS ISABEL BEVIER. What may be regarded as the function of the supervisor?

MISS B. M. TERRILL. In Vermont the supervisor instructs the class in methods and has an assistant for that work.

MISS ISABEL BEVIER. What is meant by the term "state supervisor"? By whom is she appointed? By the Vocational Board or by the University?

MISS AVIS MILAM. In Oregon there is a double relationship, the supervisor being a joint appointee.

MISS A. L. MARLATT. In Wisconsin the state board appoints the supervisor on a civil service basis. The position is still so new that no report can be given on working relationships.

MISS ANNA RICHARDSON. In one State the State Board for Vocational Education and the State Board of Agriculture are one and the same. In only two States are there supervisors of teacher-training employed on the staff of the State Board for Vocational Education.

THE CHAIRMAN. I take great pleasure in presenting to you Doctor E. O. Jordan of the University of Chicago who will now discuss "Food borne Infections."

#### FOOD-BORNE INFECTIONS

BY DR. E. O. JORDAN

(Abstract of address)

There is no evidence that bacteria which produce the diseases of plants are pathogenic to man. Bacterial diseases of plants, therefore, do not appear to be dangerous to human life.

Pathogenic bacteria in food may be transmitted in the food directly from an animal or may be due to contamination by a human carrier. Through milk, diseases of an animal may be transmitted to man. Instances have been reported from Malta and surrounding lands in which the use of milk from goats suffering from diseases have produced human infection; foot and mouth disease is transmissible from cattle to man through milk, as may be, also, bovine tuberculosis. However, there is no well-established instance of human infection from the meat of tubercular cattle.

Bacterial forms through which infection is most often traced are the members of the paratyphoid group (*B. paratyphosus* or *B. enteritidis*). Outbursts of meat poisoning are likely to be traced to one of this group, because these forms are not easy to guard against. Records show that careful inspection of meat does not always determine the presence of the bacteria of infection. Hence, whenever possible, it is well to know whether or not the animal has been ailing before it was killed. Where food has been contaminated at its source the safeguard is thorough cooking.

The danger of food contamination enroute to the consumer is considerably greater than is that of contamination at its source. The milk supply is a potent source of infection through typhoid carriers. Diphtheria and scarlet fever are other well known milk-borne infections. The infection of spaghetti prepared by a typhoid carrier in southern California is reported.

A form of food poisoning now attracting much attention is known as botulism. Canned vegetables, among which may be mentioned corn, beans, asparagus and canned fruits, have been found to be a source of infection. Within the last few weeks eight deaths have occurred in Ohio and five in Detroit due to the use of ripe olives. Most of the reports of infections have come from the Pacific coast. Whether that section of the country offers peculiar local conditions favoring the growth of the organism, or whether the explanation is found in the greater attention paid there to this subject, has not been determined. An objection to the theory of strictly localized geographical distribution is found in the cases of forage poisoning in Kentucky and Illinois, traceable to this same organism.

*B. botulinus* is an anaerobe and its spores are highly resistant; hence it is difficult to destroy it. Furthermore, hermetic sealing presents a favorable condition for the growth of this anaerobe. Poisoning is usually traced to domestically canned foods. There are only two or three cases on record where factory prepared goods have been found to be responsible. This may be attributable to several causes. The processing temperatures are not apt to be as high and the cleansing is sometimes less adequate in the case of the home canned foods. However, it should be mentioned in this connection, that Harvard investigations of commercially canned foods tend to show that the canning process does not necessarily sterilize the contents of a can.

Obviously it is impossible to conduct examinations of all food. Consequently any investigation looking towards greater safety in this respect should seek to get at the origin of the product, the areas in which the organism is likely to occur.

MISS KATHERINE BLUNT. Is it true that all foods infected with the botulinus organism are characterized by an unpleasant odor?

DOCTOR JORDAN. That statement has been made and it has also been contradicted. In some cases an acid taste is noticeable. Whether all strains produce such an acid taste has not been determined.

MISS A. L. MARLATT. Will the heat of the ordinary cooking process make infected food safe for use?

DOCTOR JORDAN. Some of the more resistant strains experimented with are not destroyed; but cooking is recommended as a routine practice.

THE CHAIRMAN. Doctor Katherine Blunt of the University of Chicago, will now inform us touching "The Present Status of Vitamines."

[This paper has been printed in the January number of the American Home Economics Association Journal. EDITOR.]

THE CHAIRMAN. The next paper on "Plans of Public Health Dietetic Work," will be presented by Miss Margaret Sawyer, Director of the Bureau of Dietitian Service of the National Red Cross.

## PLANS OF PUBLIC HEALTH DIETETIC WORK

BY MISS MARGARET SAWYER

The recent war experience of the Red Cross in supplying dietitians to the Army and Navy resulting in the formation of the Bureau of Dietitian Service, which is now an integral part of the Red Cross Department of Nursing, has brought prominently into the foreground the question of the relation of this bureau and its activities to the work already being done by federal and state extension agencies. The war has furnished a most instructive and forcible object lesson in demonstrating the importance and necessity of definite plans for cooperation between these agencies.

The necessity, which early in 1917 precipitated a sudden call for dietitians, was the formation of base hospital units in the personnel of which were included trained dietitians. To this need there was added the equally pressing one of supplying trained home economics teachers as instructors for classes of women who were studying home dietetics under the direction of local Red Cross chapters. Accordingly, a national committee on Red Cross dietitians was appointed by Miss Delano, in conjunction with the department of nursing, and this committee enrolled dietitians and acted specifically as advisory to the department of nursing when professional knowledge was needed. In May, 1917, a dietitian, Miss Elva A. George, was assigned to the Bureau of Instruction at Red Cross headquarters to take charge of this work. The obstacles with which she was confronted were many. There was no standardization for training, no organization of dietitians; there were constant and overwhelming offers of assistance and requests for appointment from dietitians and innumerable requests for instruction from the lay woman. These difficulties and their solution disclosed the need for some kind of national unity and for a working basis by means of an organization. In March, 1918, all this work was given to the newly created bureau of Red Cross dietitian service.

This bureau has acted not only as a clearing house, but as an actual reserve for the Army and Navy. Candidates wishing to enroll file applications with the Red Cross bureau which immediately investigates, by sending for school and other credentials, the fitness of the applicants. The necessary endorsement of two members of the national committee for those who meet the required two years of household economics training and subsequent experience in either teaching or institutional work, completes certification by the bureau and an enrollment card is then sent to each candidate and registration is thus completed. Dietitians with teaching experience are qualified as instructors, those with hospital experience are listed as eligible for military hospital service. The latter group automatically becomes subject to the call of the Surgeon General for military service in the United States or overseas. When a dietitian is accepted by the Surgeon General's office for a definite assignment her papers are transferred to the War Department and her services are entirely at the disposition and discretion of the Surgeon General's office. The names of those listed and appointed as instructors are sent to the division directors of nursing, where they are used in advising chapters wishing to find instructors. Simple enrollment without military assignment, or industrial appointment, signifies only the opportunity to serve, pending notification of a definite need for services.

Applicants who do not fully meet the requirements are put on a deferred list, subject to further reconsideration.

The difficulties the bureau encountered aside from the enormous clerical burden of enrollment, were mostly in accommodating all the diverse individual preferences for assignment and inclinations for particular type of service with the exigencies of the need. A request from the Surgeon General's office for a dietitian at Camp Grant on the first of August, for example, meant innumerable telegrams and rearrangement before the Red Cross bureau could report availability to the War Department and assure the dietitian's arrival at the post of assignment. It is to be remembered in this connection that all this enrolling had to be done in a comparatively short time by machinery only recently put together. Early in 1917 about 100 dietitians were enrolled at headquarters; by November of 1918, over 2,000 trained teachers of the home dietetics course and institution workers were enrolled. About 300 of these were in service in the United States or overseas at the signing of the armistice.

In addition to assignment and enrollment of dietitians, the bureau undertook to give a course of instruction, the aim of which was to supplement the courses in elementary hygiene and first aid. The bureau was unable, because of its overworked personnel, to manage the publicity incumbent on such an enterprise, or to develop adequately the substance of the course. Even with the elementary text-book, compiled and distributed by the Red Cross, and the addition of various new outlines, the substance left room for supplementing and directing. The result of this insufficient publicity was overstimulation in some localities where the instruction was in the hands of enthusiastic or expert teachers and supporters and understimulation in others.

However, with these two major activities of conducting the course in instruction and attending to the mechanics of enrolling and assigning, the bureau was kept busy until the signing of the armistice and the subsequent modification of the work on a peace instead of a war basis. Would all this organization, accumulated experience and coordinated training be immediately sloughed off? This was the question asked of everyone connected with any war emergency structure and it was asked of this particular service. The Red Cross has an organization which reaches every one of the national interests, has no party affiliations, and no political or social prejudices; and it has every type of man, woman and child in the United States attached to it by bonds of closest sympathy and understanding. It stands in the unique and isolated position of the medium through which great energy can be translated into action by coordinating and binding all these heterogeneous interests. Despite this very conspicuous present, but perhaps only temporary, advantage which the Red Cross now holds, it does not propose being in any sense the permanent and ultimate organ of unity. It hopes only to effect a temporary basis for cooperation of agencies already in the field; to introduce its activities in hitherto unoccupied fields; simultaneously to stimulate public interest in and to create a demand for the kind of public welfare work being done by state and federal agents.

In general such a policy can be applied to the bureau of dietetics concretely in two well defined ways. The Red Cross can act as a supplement to those agencies already in the field or it can be wisely and ably supplemented by them. With its highly efficient decentralized organization con-

sisting of 14 divisions, and 3,709 chapters, enabling it to reach out to the most remote district and smallest hamlet, it is already amply equipped. The bureau director in each division office who is a home economics woman familiar with both extension problems and possibilities and who can cooperate with state extension directors, holds the key to all future possible potentialities. In these divisions there are now about 2,500 workers. The division directors have registered in their offices a list of trained workers geographically classified so that they can assign them to convenient localities. These federal and state agencies can supplement the Red Cross by giving it the results of their research, for the Red Cross has no educational backing or affiliations and no equipment for investigation. They can give it results of their specialized study of the problems of particular communities. If the Red Cross is not permitted to profit by this experience, it may run deliberately into many dangers and commit many extravagances. It may, for instance, go into a field where its course is not suitable. You may be interested to know that precisely this plan has been worked out between the States Relations Service of the Federal Department of Agriculture and the American Red Cross.

This working basis has also been made use of in connection with the new course in home dietetics given by the Red Cross which is being planned in cooperation with the Federal Department of Agriculture. You are all familiar with the nature of the old course. The purpose of the new course is to teach food values and principles of nutrition in so simple a way that they can be applied to the immediate problems of the individual or the household. The subject-matter, which is suggestive and will therefore need in every case further development in the shape of adaptation and elaboration by the instructor, is particularly elastic in its appeal to fill the varied needs of housewife, industrial worker, and rural and city dweller. Because there is no laboratory equipment for practice work, all theory is applied immediately to the home kitchen. This close correlation of home practice and studied theory is supposed to nurture the concept and develop the automatic application of the principles learned. There is to be no intervening link between the newly learned fact and its application.

I give this rather detailed explanation of the new course simply as an illustration of the principle which is to guide the activities of the bureau and to justify both its present and future existence. It is preeminently an organ through which urgent needs can be met. In 1917 enrollment and assignment of dietitians was the imperative emergency; in 1919 there seems to be a concerted desire for adequate knowledge of diet and selection of food. In 1925 there may arise an entirely different need which the Red Cross bureau of dietitian service, with your assistance, hopes to meet. The bureau has further plans which it hopes will develop into lasting benefit, but this hope can be realized only through cooperation with federal agencies which are fundamental and permanent.

THE CHAIRMAN. Miss Florence E. Ward of the States Relations Service, will now give a report of accomplishment of "Home Demonstration Agents of the North and West."

## THE ORGANIZATION AND DEVELOPMENT OF EXTENSION WORK WITH WOMEN IN THE NORTHERN AND WESTERN STATES

BY MISS FLORENCE E. WARD

The story of how extension work with women in the 33 Northern and Western States expanded under the spur of war from the service of a small group of home economics pioneers to a well defined force of several hundred workers, providing leadership for nearly a million housewives is dramatic in its human interest and telling in its facts and figures. It is significant that the organization for this work created in the days of peace to help women perform more easily and more efficiently their homemaking activities and to give them a broader outlook on life, was capable, in a great emergency, of rendering such substantial service. Not less significant is the fact that this organization, extended for war service, has quickly readjusted itself to problems of reconstruction and peace and is proceeding with new insight and power to take up the duties for which it was originally created, notwithstanding the fact that the federal appropriations were reduced about one-half at the close of the war with a proportionate falling off in the number of workers.

On December 1, 1918, 579 home demonstration agents and leaders were employed in the 33 Northern and Western States at a total expenditure of federal, state and local funds of \$1,235,335, of which amount \$151,063.39 was supplied locally. On December 1, 1919, there were 292 home demonstration agents and leaders employed in the 33 states, at an expenditure of federal, state and local funds of \$747,360.79, \$282,135.72 of which amount was voluntarily appropriated by the counties and the farm bureaus, the county appropriations ranging from \$500 to \$1,500. This shows that the appropriations made by the local people for extension work with women have almost doubled during the past year. Every agent now located in a county has been placed there in direct response to requests from the people by whom she is staunchly supported in carrying out a program of work suggested by local needs.

### ORGANIZATION

With but few exceptions home demonstration work has been carried on in counties during the past year through a permanent organization of the people. In the majority of the States this organization is known as the farm bureau, the recognized county organization through which the people, the Agricultural College and the Department of Agriculture cooperate in the consideration of problems of the farm, the farm home, and the community, and in which the interests of the home and women's part in community development have been coordinated with the work in agricultural development. During the past year the States have endeavored to develop community organization by uniting the interests of the men, the women and the boys and girls in a county program, looking toward the development of agriculture and homemaking, more convenient homes, lightened labor, better health, greater contentment of the people, and larger profit from effort and money expended.

One outstanding feature of the work and that which marks its success is the strong self-reliant community groups of homemakers who analyze county and community needs and under local leadership seek to meet these

needs with such assistance as the home demonstration agent and the extension specialist can give. Reports from 29 States show that 336 counties have been at work on activities of their own selection. Some of the counties which have adopted programs of work are as yet without home demonstration agents, but the women have organized local committees and appointed local leaders and with the assistance of agricultural agents within the counties and the state leader and extension specialists, are carrying on home demonstrations among themselves until such time as funds may be available for the support of home demonstration agents.

#### RESULTS

Among the past year's accomplishments reported by the States the following results in some of the more important lines of work may be mentioned.

Interest in feeding the family, especially children, along more scientific lines has been a project in practically every state in the North and West. Hot lunches have been established in 2,929 schools in 152 counties, reaching 66,554 children, with a large number reported as showing an improvement in health as a result of the hot lunch at school and the increased use of milk at home.

As a direct result of educational work in the value of milk as food, the total increase in the home use of milk from 12 states alone was 1,049,015 quarts, while the increase in the use of butter in the home in those states was reported as 1,028,664 pounds. Food preservation was extensively carried on throughout the country with a marked increase in the amount of home preservation of meats through the efforts of home demonstration agents.

The epidemic of influenza during the winter of 1918-19 created a demand on the part of men and women for information in regard to the simple rudiments of caring for the sick in the home. In consequence 202 counties have reported definite programs in home nursing, personal hygiene and sanitation. Sanitary conditions have been improved by the introduction of kitchen sinks, septic tanks and window screens.

With a view to decreasing labor, time and effort as well as equipping the farm home with modern appliances, 166 counties have adopted the home convenience project with the result that many families have bought washing machines, secured fireless cookers, pressure or steam cookers and driers. Power machinery has in some cases been purchased for home use and many families have installed water systems. The introduction of this equipment is estimated to have saved the rural housewives in these counties 1,075,254 hours of labor.

Lessons on thrift, learned during the war, and the high cost of materials and labor have attracted general attention to the clothing project which was adopted by 173 counties with the result that 40,127 garments were made or remodeled at an estimated saving of \$218,390.72. The business side of housekeeping has been of special interest in 93 counties and 5,507 families have been encouraged to keep expense records. It is said that 1,078 families are endeavoring to use a system of budget making in apportioning household expenses.

Reports show that 3,100 poultry flocks were culled, eliminating 106,806 non-laying hens, thereby lessening the cost of egg production \$102,814.57,

and that the application of better market methods has greatly increased the farm woman's profits derived from poultry and eggs. Many local women have been given special training in home butter- and cheese-making and through their demonstrations of improved methods these local leaders have passed on this information to thousands of housewives.

#### COMMUNITY INTERESTS

A study of conditions in the individual home has deepened the interest and broadened the horizon of men and women in community affairs with the result that 208 community kitchens used as food, canning, drying or demonstration centers and milk stations have been established. Sixty-six cooperative buying and selling associations have been formed; 188 salvage shops have been opened; 55 community rest rooms have been furnished for the convenience of the people; and 95 recreation centers have been established.

#### THE SURVEY

Thousands of by-roads and many of the high-roads in the rural sections have still to feel their first contact with the home demonstration agent and the college specialist in home economics. This has been brought forcibly to our attention by the farm home survey recently taken (see page 259), as a result of which we now have information regarding 9,749 American country homes, which reveal surprising facts regarding the life and work of the woman on the land who is at once cook, nurse, laundress, seamstress and teacher of little children as well as an active partner in the farming business.

The survey emphasizes the fact that while the average farmer has been obliged to employ modern methods and equipment to keep abreast of the times, the methods and equipment of the average farm woman are primitive and inefficient in comparison, and that her daily round of labor averages 13 hours in summer with only one hour of rest and 11 hours in winter with 2 hours of rest. The drudgery of this long day, with its lack of leisure, recreation, and social opportunity is one of the contributing causes to the restlessness and discontent now rife among the women and girls living in the open country.

The country-wide average for the 9,081 answers to the query as to water supply shows that there is running water in only 39 percent of the farm homes. Sixty-one percent of the farm women are still carrying water an average distance of 49.3 feet. The records from one state show an average distance of 156 feet and of 12 states a distance of more than 50 feet. Indeed in one state only six percent of the farm houses contain running water. These significant facts are typical of the more than 200 items of information secured.

It is believed that these studies, which represent the country woman's own estimate of her present conditions and needs, will be a challenge to extension workers and will stimulate a high type of service along practical lines which, by contributing to the efficiency of the farm woman, will enrich the country home and enhance the prosperity of the farming business and the development of country life.

On motion, the home economics sub-committee of the Committee on



Instruction in Agriculture, Home Economics and Mechanic Arts was urged to continue the study of the organization and administration of teacher-training along the lines suggested in the current report (pages 122-126).

The committee on nominations made its report which was accepted, and referred to the general session for approval (page 145).

On motion, the Division adjourned *sine die*.

## SECTION ON EXPERIMENT STATION WORK

AFTERNOON SESSION, WEDNESDAY, NOVEMBER 12, 1919

The Station Section was called to order at 2 P. M. by the chairman, J. C. Kendall of New Hampshire.

THE CHAIRMAN. The first topic on the program is a paper by Director C. E. Thorne of Ohio, on "Correlation and Cooperation in Regard to Soil Fertility Investigations."

### CORRELATION AND COOPERATION IN REGARD TO SOIL FERTILITY INVESTIGATIONS

BY C. E. THORNE

Each state possesses peculiarities of soil and climate which can only be studied locally. In different states the relative importance of the several agricultural industries varies, so that since no one station as yet possesses sufficient resources to enable it to give adequate attention to all the phases of agriculture in the State, the emphasis placed upon different lines of investigation must vary. There are, however, a great many problems which affect areas that are not delimited by state boundaries and towards the solution of which it would seem that several stations might work in co-operation. Such a problem is the study of the relative effectiveness of the different carriers of phosphorus.

The ordinary system of agriculture, as practiced in the regions devoted to the production of the cereals and of meat and milk, is such as to exhaust the supply of skeleton-building material more rapidly than that of other mineral elements. Over large areas the surface rocks are limestones, and in these regions the supply of calcium may be maintained for a long period, but where the soil has been formed from rocks deficient in this element the necessity for replacing this deficiency may become apparent at a comparatively early date. Whether the surface rocks be limestones or sandstones, the production of grain to be shipped off the farm, or to be fed with other forage to livestock to be converted into meat or milk, must be followed sooner or later by phosphorus hunger, except in the very few localities where phosphatic rocks underlie the surface. The world around, there is more and more insistent call for phosphorus, and the question as to how this element may be most effectively furnished to our crops is constantly increasing in importance. Many of our experiment stations are at work on this problem, some of them having been engaged on it from a quarter to a third of a century, and the chief outcome of our work has been the realization that what seemed at the outset a very simple proposition has proved to be one of extreme complexity.

The importance which this problem has assumed in the minds of students of plant nutrition is illustrated in the fact that a call issued at the last annual convention of this Association for a midsummer conference of agronomists to consider it, was responded to by delegates from the United States Department of Agriculture and from 17 States, reaching from Connecticut to Missouri and from South Carolina to South Dakota.

Realizing that the great source of phosphorus is and must continue to be the natural deposits of phosphatic rock, and that when treated with

sulphuric acid this rock becomes our most effective carrier of phosphorus to growing crops, a few of the questions that rise before us are:

To what extent is the generally observed superiority of acid phosphate due to its greater solubility?

To what extent may the gypsum formed by treatment with sulphuric acid contribute to the effectiveness of the phosphate?

To what extent may this effectiveness be due to the sulphur of the gypsum, rather than to its calcium?

To what extent may decaying organic matter contribute to the solution of rock phosphate?

Is the benefit which has been claimed for decaying organic matter due to an actual solution of the rock, or may it be due to the balancing of the plant ration through the nitrogen and potassium set free by the decay of the organic matter, thus enabling the plant to utilize a larger proportion of the phosphorus?

What differences exist among plants in their power to assimilate crude phosphate?

What effect has so-called soil acidity upon the availability of rock phosphate?

It may be said that the chemical laboratory should furnish answers to most of these questions and the laboratory will certainly be called upon for its assistance; but experience has shown that in that mysterious alchemy, in which the soil, the sunshine, the rain and the growing plant participate, changes take place which we are not yet able to imitate in the chemist's laboratory, nor in pot culture experiments, and that the conclusions deduced from such experiments must be sent to the field for confirmation or revision.

We may say what we please about the difficulties and uncertainties of field experiment, and most assuredly there are difficulties and uncertainties in this work, making it one of the most exacting and recondite forms of scientific research ever undertaken. If, however, we are not able to overcome these difficulties we as scientists may as well abandon all attempt to increase the world's food production, for certain it is that our work is worthless until translated into the practice of the farmer, and if we are not able so to translate it we cannot expect him to do so.

No one station can furnish a final answer to all these questions, for they must be studied under a wider range of soil and climatic conditions than are found in any single state. Moreover, the scope of the investigation is so broad that few stations will feel able to undertake the entire inquiry; but by parcelling out the work, assigning part to one station and part to another, and so articulating the whole that there will be a common ground on which all will meet, it will be possible at least very materially to enlarge the boundaries of our knowledge on this subject.

It would seem that work similar to this might also be undertaken in the field of animal nutrition. We have many of us been conducting experiments in animal feeding that have been helpful to the farmer and useful training to the feeder; but the ultimate principles which govern the nutrition of the animal organism are more complex and recondite than those relating to the plant, and thus far many of us have been only skimming the surface in the one as in the other.

Much has been said about duplication of work, but we need more

duplication rather than less. In plant and animal nutrition we are dealing with so many different factors and the opportunities for error are so great that our results need many confirmations before they can be accepted as final.

The informal conference to which I have referred has raised the question whether the stations of the states occupying the upper Mississippi Valley might not with advantage follow the policy which has already been inaugurated by the New England stations, the cotton-belt stations, and the dry-land stations, by getting together occasionally for consideration of the problems that particularly concern this region.

It would be a very great misfortune if such district organizations were to prevent such national conferences as the one we are now holding, but I feel that we need both the national and the district conferences if we are to get the help from each other that we need for the conduct of the greatest scientific inquiry ever undertaken by man.

THE CHAIRMAN. A symposium on cooperation among experiment stations will now be held. Papers will be presented by Directors H. G. Knight of Oklahoma, R. W. Thatcher of Minnesota, and A. W. Drinkard of Virginia.

#### COOPERATION AMONG EXPERIMENT STATIONS

BY H. G. KNIGHT

It seemed advisable, as a precedent to this discussion, to find out what success the stations have had in cooperating with each other, what sort of investigations could best be conducted in cooperation and whether or not cooperation was worth while. Consequently the following questionnaire was mailed to all station directors:

"1. Has cooperation by your station with other stations been attempted—if so, with what success? What has been the nature of the cooperation?

"2. Upon what types of investigational work in your estimation can stations cooperate satisfactorily?

"3. Is it desirable to urge cooperation among the stations?"

Forty-four directors responded. Twenty-two reported that some cooperative work had been done with one or more stations; 21 that no cooperative work had been done, and one did not answer. Sixteen of the 22 found cooperation a success, one stated that it "could not be considered as having produced good results"; one said that he was "not inspired by the results"; and four were non-committal. Thirteen stations reported in more or less detail as to the nature of the cooperation. In a few instances where problems were in hand which were of interest in two or more states the field of labor was divided, while in other cases regional questions, such as the soft pork problem of the South upon which many stations are now engaged, were being studied. The answers were not always clear as to whether actual cooperation was being done or investigation along certain lines encouraged.

There was entire unanimity of opinion as to the types of investigation upon which stations may cooperate most satisfactorily. The larger problems were cited, those in which two or more states are especially interested, such as certain phases of soil investigation, Hessian fly (free dates)

feeding of livestock, plant diseases, carriers of phosphorus, and problems involving climatic changes, etc.

Thirty-one directors favored urging cooperation among the stations, five were doubtful as to the desirability of stressing it, while four answered in the negative. Two preferred to foster rather than to urge it, while three did not state their opinion.

Some of the objections to cooperation may be stated as follows:

1. It is undesirable on general principles, although occasionally the nature of the problem may require it.

2. Investigators do not see problems from the same angle.

3. Jealousy retards the work.

4. Real cooperation rests with the individual.

5. Research is a matter of individual initiative and enthusiasm.

The types of investigations which would seem to lend themselves to cooperative effort may be classed—neither satisfactorily nor conclusively—under the following heads:

1. Economic problems, such as the nature and control of certain plant diseases which may cover a territory involving two or more states.

2. Problems involving climatic factors, such as the effects and causes of climatic factors upon the availability of certain soil constituents.

3. Problems of general interest, such as the soft pork problem of the South.

4. Basic problems, such as the carriers of phosphorus, feeding practice, plant physiology, etc.

A problem must be of wider than state interest, otherwise little cooperation can be expected. If, however, it is related to a very large area, it often may be well to enlist the activities of the Federal Department.

The problem may be divided. The workers in one state may be especially qualified in one field and to deal with one phase, while the investigators in the other state are better able to handle another phase. There is very little possibility of conflict of interest when cooperation is thus carried on. Methods may be so standardized that the results obtained at one station may be compared with those obtained at another. There is much need of this type of cooperation in order to obviate waste. The Association of Official Agricultural Chemists long ago compiled the official methods of analysis and have kept them up to date by means of frequent revision. These methods have been consistently used throughout the experiment station system. Many problems involving nutrition studies, food values, etc., can be thus attacked to advantage.

The field may be divided. Experiment stations in neighboring states with similar climatic conditions may agree to apportion the field in order that their efforts may not be duplicated. One station may study the plant physiological phases of the subject, while the other does the plant breeding work, the understanding being that full discussion be had and a free exchange of results be made. Cooperation of this character has been worked out in a measure among the northwestern stations.

Advertising may tend to stimulate an increased interest on the part of station investigators in a given subject. An example of this is to be seen in the soft pork studies from which we may expect fruitful results, although apparently little real cooperation is evident among the investigators themselves.

Each station should work upon its problems as they appeal to the workers or with a view to the state's peculiar interests. Frequent conferences among investigators would do much to lessen jealousies and tend to promote greater cooperative effort.

Unfortunately most of our stations are not now financially able to send their investigators to attend group conferences upon matters of regional interest. They ought to be brought together more frequently. Too often the research worker because of his narrow and local view fails to grasp his problem in a large way or to realize its broad applications. Conferences of executives of neighboring states are well worth while but are often less productive of quick returns than conferences of the investigators themselves.

It is possible that many problems of wide interest and application could best be handled through cooperation with some federal bureau. In a few instances a federal bureau has cooperated with several stations and served as it were as a binder. In most cases where this has been systematically planned the outcome has been very satisfactory. Unfortunately, however, the bureaus have done but little to focus the attention of the state stations upon problems in which they are cooperating with the Department.

During the war much progress was made in investigation along certain lines by what may be called "mass research." Some of our large industrial concerns have used this system to advantage. A number of scientists pool their interests, concentrating upon a certain line of investigation. Conferences are frequent. Any decided advance is promptly made the property of all who are working upon the problem. Experience indicates that far more rapid progress is made than by the same number of men working alone. It is not clear, however, just how this principle of mass research can be applied to cooperation among the stations. There would be as many organizations to deal with as there are stations cooperating upon any particular problem. This method of attack seems practicable only where frequent conferences may be held, where all are working within one organization and where, as Kipling indicates,

"No one shall work for money  
And no one shall work for fame,  
But each for the joy of the working"

The experience of the New England stations in their cooperative effort may be of interest. Annual meetings of the directors have been held usually in March, beginning in the early eighties. Sometimes station chemists or other station workers have sat with them. The early meetings were devoted very largely to questions of fertilizer valuations and control work. These matters were of mutual interest and it was of course necessary that methods and rulings be as nearly uniform as possible. During later years plans for closer cooperation among this group of stations have been outlined and there has been an exchange of information touching projects. Committees have been appointed to study the work which was being done by the different states on the subjects assigned to them, which are expected to make recommendations looking toward further work and suggestions relative to the way in which the stations might cooperate effectively. There has been thus brought about a clearer understanding of what is being done in the neighboring states and much good accomplished.

Several difficulties arise if work of a cooperative nature is attempted between stations. There is the matter of crossing state lines which bother many of us. The Attorney General of Oklahoma has ruled that the expenses of state officers, including the agricultural college faculty, while outside state borders can not be paid from state funds. The expense of attending conferences in neighboring states would probably be held to come under this ruling, which is discouraging, not to say disconcerting.

It has been my experience that many investigators tend to outline more work than they can properly handle and that most stations are called upon to study more problems than they can finance. Therefore, it becomes a matter of serious concern financially for a station to enter upon a line of cooperative investigations. It often implies a change in its organization.

Many investigators feel a sense of ownership of the problems upon which they are working. This is sometimes called "professional jealousy." Furthermore there is a feeling that there are men abroad in the land who lack of fine sense as to professional ethics. There is real fear in many cases that full measure of credit will not be awarded to the workers. Investigators should not be criticized for this mental attitude, for we measure their value by their output.

Research is very much a matter of personal initiative and interest. It seems to be difficult to get an investigator to take up another's incomplete problem. The new comer's point of view is not that of his predecessor; he is inclined to use different methods. Two men, placed on the same problem and given the same start, usually in a short time are working upon different phases. This is a difficulty which must be reckoned with in attempting cooperation.

In conclusion, I am inclined to urge:

(1) That a better opportunity should be given investigators for conferences covering great basic problems. Group conferences of investigators working in regions where conditions are similar are desirable. A free exchange of ideas and of projects should be encouraged.

(2) That cooperative effort should be encouraged upon fundamental, basic and regional problems, as well as upon problems the outcome of which is likely to be affected by changes in climatic conditions. This in many instances may best take the form of arousing interest in the subject with suggestions upon the fields in which investigation would probably be of profit.

(3) That personal initiative should be fostered and, in so far as is consistent with good organization, that personal interests should be given first consideration, even though such a procedure seems to involve the retardation of the work.

(4) That cooperation among experiment stations is of minor importance, in view of the total volume of research output. Much more systematic and active interest will be needed before this relation is materially altered.

#### COOPERATION IN RESEARCH

BY R. W. THATCHER

I do not have before me, as I am preparing this brief paper, any information concerning what the men who precede or follow me in discussing

this subject will have to say about it. I assume, from certain questionnaires which have come to my office, that Director Knight, at least, is planning to discuss the present status of cooperation between experiment stations in the investigation of problems which are of wider interest or have wider applications than the geographical limits of a single state would impose. I presume that other speakers will discuss the effect upon the character of work on a research project of an arrangement for cooperative study of the problem by more than one station staff; or the effect upon the attitude of individual investigators toward their research work of imposing upon it such administrative control or outside supervision as might be implied or required by cooperative agreements between stations; or possible methods of arranging for and carrying on cooperative work between stations, if such a plan be found desirable.

In order to avoid the possibility of duplicating—or perhaps of contradicting—the statements of other speakers, I have planned to take up a phase of the subject which I think there is little likelihood that other speakers will discuss. I refer to the attitude of the general public toward research men and the results which have been brought about, in part at least, by a lack of cooperation, or, what is worse, by direct controversies or public criticisms of each other's work, among men who are engaged in publicly-supported research work.

The most flagrant example of what I am about to discuss and of its effect upon the public mind, is to be seen in the reception of so-called "expert" testimony from what are technically defined as "opinion witnesses" in court cases. I would be the very first to disclaim any responsibility for or acceptance of the real "expert" character of many such witnesses. It is easy, of course, to employ men who style themselves "experts" to testify on either side of any question which is in dispute before a court. But there are many cases in which men of real technical training and experience and of thoroughly impartial attitude of mind are called into court and express their "opinions" in exact opposition to each other. The inevitable result is that the judge or jury has either to endeavor to decide which of the witnesses has the best qualifications for forming his opinion or the higher professional standing, so as to entitle his opinion to greater weight, or else to disregard altogether the opinions expressed by experts and to reach their decision on the basis of other evidence which, theoretically at least, is less expert and less impartial. In very many cases, the latter plan seems to be followed and so-called "expert testimony" has little weight in the final decision; or, to state it another way, courts seem to have come to hold in very light esteem the evidence of "experts."

Now, much as I regret to say it, I believe that much the same general reaction upon the court of public opinion is produced by the opposition and public criticism of each other's work and points of view in which many of our scientific workers seem to delight to indulge. I believe in academic freedom of thought, speech and authorship. I admit that a sincere desire to prove or disprove the correctness of a theory advanced by another worker, or to confirm or disprove the accuracy of his observations and conclusions, may be a powerful and legitimate incentive to active and thoroughly scientific investigation of the same problem by other workers with different technical training and experience. I might even admit that in some cases the desire to out-do some other investigator in a battle of wits,



skill and work may be the most powerful stimulus to young scientists thoroughly imbued with the American spirit of "playing the game" to win. But I submit that this is not the true research spirit, "the love of truth for truth's sake" which is the real foundation for all scientific research.

I would be the very last to argue against careful review of any work upon which public confidence is to be based and upon which agricultural practices are to be developed. I believe in sufficient duplication of work to insure the highest degree of certainty which it is possible for human agencies to secure. I am perfectly cognizant of the many unfortunate results that have come about from the following of immature or improperly supported advice from experimental investigators. Nothing is more necessary in these days than that our publicly-supported research work shall be able to withstand the most exacting investigation by scientific methods and the most varied trials in practical application. I am, therefore, heartily in favor of enlisting as many different workers with as varied experience and training as possible, in the attack upon any problem of research which may properly be undertaken in our stations.

But the point that I want to make is that if we are to strengthen the confidence of the general public in the results of our work, this diversity of attack upon our research problems ought to be constructively cooperative in character rather than destructively critical. I do not think that I need to cite specific instances to bring to your minds the many controversies between scientific men which have been carried on in scientific journals, or, what is worse still, in public newspapers. Sometimes these have gone to the point of actual criticism of each other's integrity and honesty of purpose. Such unseemly action is deplored by every one and furnishes agitators and demagogues with ammunition for their attacks upon our educational and research institutions. But worse than this, I am convinced that it leads to a great and growing skepticism in the minds of the general public of the soundness and impartiality of the findings of research men.

Lest I be suspected of being unduly pessimistic in my statements, I hasten to say that I know that many facts and principles of agricultural science which have been developed at our stations in the past have been accepted without question and put into successful practice. I believe, too, that educated men and women, who are accustomed to the "give and take" of intellectual associations, are not disturbed by differences of opinion among scientific workers. But the subjects which have been assigned leading places on the programs of this and many similar conventions exhibit a recognition of and real concern over the lack of general public support for research work. I fear that this lack of public support, while undoubtedly due in some part to lack of public understanding of the scope, purpose and methods of research work, is due in a larger measure to lack of public confidence in it. My plea at this time is for a more united feeling among our station workers and the presentation of as nearly an undivided front on these matters as it is possible for us to obtain.

I admit that the establishment of cooperative relations between different experiment stations may not go very far toward this desired end; but it would seem to me to be a step in the right direction. Mere administrative agreements to cooperate will, of course, do nothing to inspire public confidence. But if they lead to the development of a real spirit of constructive cooperative attack upon the problem in question, and of

friendly attitude of the investigators toward each other, they will do much to remedy public distrust of the objects and methods of research workers. It is obvious that mere formal agreements to cooperate which deal almost exclusively with distribution of expenses, allotment of professional and institutional credit for the results obtained, etc., are mere administrative machinery, which, while necessary to insure proper initial understandings, have little direct bearing upon the development of a real spirit of helpfulness and confidence between the research workers involved in them.

I am as anxious as are any of my esteemed friends who have opposed the idea of multiplication of administrative machinery and supervision, to avoid the stifling of the research spirit in individual workers by official duties or control; but I do believe that it is a vital need of the present situation that we all do all that we can to bring about a real spirit of friendly cooperation and unity among research workers.

At the Minnesota station, we are already beginning to see beneficial results from the breaking down of departmental bars and the inauguration of cooperative studies of both research and instructional problems in our animal industry group and our plant science seminar, both of which have brought into conference and cooperation all of the men in our department of agriculture as well as scientists from allied fields of knowledge on the faculties of other colleges of the university, who work in the fields of science or industry which are related to the animal industry or of economic plant production. I am confident that similar beneficial results can be obtained if similar cooperation can be obtained between larger groups of scientists, connected with different institutions which are engaged upon problems of common interest.

With this for its purpose, rather than purely administrative convenience or control, I am heartily in favor of cooperation between stations in their research work.

#### COOPERATION AMONG EXPERIMENT STATIONS

BY A. W. DRINKARD, JR.

The cooperation of men of science in handling the technical problems of the war furnishes a conspicuous example of the possibilities that exist for applying the same principle to agricultural problems in time of peace. During the war, machinery was created to bring together the leading minds in particular fields of research and the public need supplied the stimulus to action by which these men gave their best efforts to the cooperative solution of many intricate problems of modern welfare. If the agricultural experiment stations fail to learn a lesson from this successful cooperative war work, they will miss a great opportunity for enlarged public service.

Cooperation among experiment stations seems desirable from several points of views.

1. The contact of station workers in similar lines of research will prove stimulating to the workers themselves and mutual counsel will broaden the outlook on station problems.

2. Cooperation will become a means of husbanding the meager resources of the stations and of making possible the extension of their work.

3. Cooperation will be of incalculable value in promoting general

welfare and of returning to the public larger results for the money spent in agricultural research.

4. Needless duplication of effort will be avoided.

5. Standardization of methods will accelerate progress in experimental work.

There are obstacles in the way of effective cooperation and the problem of making cooperation effective consists chiefly in overcoming these obstacles. There is sometimes a strong feeling of individualism in the ranks of station workers which often stands in the way of effective cooperation. Surely these obstacles may be overcome without doing harm to personal initiative or without impairing the reward of individual achievement. The station worker often feels that a large part of his reward is the due credit he receives for having contributed to the progress of science. No cooperative arrangements need take away this feature of a scientific career, but all workers in state institutions must recognize the fact that public service is paramount to the career of an individual public servant.

On the whole, the obstacles in the way of cooperation among stations are not insurmountable and they are of less moment than the great advantages of cooperation in economically and quickly advancing the public welfare.

If cooperation is desirable, what forms shall it take? Several types of problems are recognized in the field of agricultural research.

1. Strictly local problems which are concerned with a principle or principles which can be handled on the spot and often by an individual worker, in which cooperation would not necessarily advance the project.

2. Institutional problems which may very well be handled by the cooperative efforts of workers in the same institution.

3. Regional problems which involve an application of results to agricultural conditions in a considerable region of the country and require for their solution experiments under the soil and climatic conditions of many places. In this class may be mentioned problems in animal nutrition, plant nutrition, studies of soils, control of insects and diseases, etc. These and many other similar problems may be attacked in concert by workers at several institutions. There may be a profitable division of the phases of such problems among workers at several stations peculiarly fitted to handle them. These phases may be so related that the completed parts will fit into the solution of the whole. Thus in a relatively short time many workers may produce results of great value to the public. The efforts of one worker supplement those of his cooperators and the public welfare is promoted by the arrangement.

What should be the machinery for making cooperation effective? In many cases it must be a voluntary arrangement between institutions. For many other cases, the thought suggests itself that there is need for a central clearing house for these cooperative undertakings. So far as these cooperative undertakings concern researches and experiments supported by federal funds, it seems feasible to negotiate these arrangements through the Office of Experiment Stations, perhaps through the efforts of the Joint Committee on Projects and Correlation of Research of this Association.

F. D. FARRELL of Kansas. Director Thatcher makes some excellent suggestions, but they raise the question of the payment of the travel expenses of investigators and others from state funds. In Kansas we are under the

supervision of a board which has 96 other institutions in its charge and has to be very careful about authorizing travel outside the State at state expense. For similar reasons the question of the expense involved in attending regional or national meetings is a serious one in many instances.

I believe cooperation is essentially a matter of acquaintance and understanding. We find that true usually in our departmental relationships in our own station and I think it generally would be found true.

If we had more intercourse with each other and, in addition, specific suggestions similar to those made by Director Knight, the problems of cooperation would tend to solve themselves.

**THE CHAIRMAN.** The Office of Farm Management of the United States Department of Agriculture and its Relation to the State Agricultural Colleges and Experiment Stations will be discussed by the chief of that office, Dr. H. C. Taylor.

**THE OFFICE OF FARM MANAGEMENT OF THE UNITED STATES DEPARTMENT OF AGRICULTURE AND ITS RELATION TO THE STATE AGRICULTURAL COLLEGES AND EXPERIMENT STATIONS**

**BY H. C. TAYLOR**

It is with great pleasure that I find myself representing the interests of economic research at a meeting of experiment station directors. Prior to the days of experiment stations the economics of agriculture was better developed than were the physical and biological sciences in their relation to agricultural problems. As evidence of this condition attention is called to the English literature of the latter part of the eighteenth and the first part of the nineteenth century, especially the extensive writings of Arthur Young and William Marshall, the country agricultural surveys made by the Board of Agriculture and the writings of Adam Smith, James Anderson, David Ricardo, T. R. Malthus, and others relating to the economics of agriculture from the individual, the social and the national points of view.

That the new impetus to agricultural research should be in the less well developed fields is rational, and since it was work requiring the experimental method which was most needed it is perfectly easy to understand why the institutions established by federal aid were called experiment stations instead of research stations. With the development of the experiment stations those lines of research work requiring the experimental methods have made great progress, but the slight attention given, for the time, to other methods of research has left subjects like economics, which lend themselves to the accounting, statistical, historical and geographical methods rather than to experimental methods, relatively undeveloped. Should not the experiment stations study all the forces in the farmer's environment whether they be physical, biological or economic forces? If not, should another research organization coordinate with the experiment stations be developed for this work? The directors of experiment stations are answering these questions by accepting the view that every method which will throw light on the subject should be used in agricultural investigations and that the whole list of problems confronting the farmers should be studied. With this broadening of the scope of the experiment stations, the studies which have been introduced under the various titles of farm management, farm

- economics, rural economics and agricultural economics, rural life and rural sociology, require our especial attention.

As early as 1905 the Office of Experiment Stations established a section on rural economics in the Experiment Station Record. In 1906 the United States Department of Agriculture started the work in farm management which remained in the Bureau of Plant Industry until 1915 when the Office of Farm Management was established in the Office of the Secretary. In 1913 the Department started work in markets and rural organization. In 1908 the Graduate School of Agriculture first gave recognition to this subject by giving it a place in one evening program. In 1910, agricultural economics, farm management and rural sociology were given a major position in the graduate school. By this time many colleges and stations were putting in courses of study and stimulating research in this field.

In the establishment of this new line of work, men especially trained for the work were scarce. As a result recruits were accepted from various other branches of agriculture and from the field of practical experience.

The lack of special training on the part of many of the men enlisting for this work resulted in much wandering about in the field without chart or compass. Many things were done which were not worth while or which duplicated the work in agronomy or animal husbandry while many important questions received little attention. This condition has been improving rapidly in recent years and an important step was made when Secretary Houston called a representative committee together last February to plan the reorganization of the Office of Farm Management. That committee outlined the research work to be carried out by the proposed Bureau of Farm Management and Farm Economics in cooperation with the Agricultural Colleges and Experiment Stations. This outline of work, with slight modifications made by later conferences, is as follows:

#### OUTLINE OF RESEARCH WORK IN FARM MANAGEMENT AND FARM ECONOMICS

- I. Cost of production—
  1. Financial records.
  2. Enterprise records.
  3. Complete cost records.
  4. Price relations.
  5. Basic unit factors.
- II. Farm organization—
  1. Types of farming.
    - a. Determination of enterprises.
    - b. Plan or combination of enterprises.
  2. Size of business.
  3. Farm plan or layout.
  4. Effective use of labor and equipment.
  5. Intensity of production.
  6. Business methods.
- III. Farm finance—
  1. Methods of financing.
  2. Insurance.
  3. Taxation.
  4. Other financial relations.
- IV. Farm labor—
  1. Supply and movement.
  2. Trend of population.
  3. Living and housing problems.
  4. Creating new productive enterprises for farm labor.
  5. Standards of supervision and compensation for farm labor.

- V. Agricultural history and geography—
  - 1. Trend of agricultural development.
  - 2. Shifts of agricultural production.
  - 3. Relation of American to foreign agriculture.
  - 4. Supervision of Atlas of American Agriculture.
- VI. Land economics—
  - 1. Land resources.
  - 2. Land values.
  - 3. Land ownership and tenancy.
  - 4. Land settlement and colonization.
  - 5. Land policies.
- VII. Farm life studies—
  - 1. Rural home life.
  - 2. Opportunities for social contacts in typical rural communities.
  - 3. The relation of educational and religious institutions to farm life problems.
  - 4. Problems relating to geographical population groups.
  - 5. Social aspects of tenancy and landlordism.
  - 6. Rural organization.
  - 7. Social aspects of various types of farm labor.
  - 8. The relation of various forms of disability.

#### COST OF PRODUCTION

The first section of this outline deals with the application of accounting methods to the problems of the farmer. Just as the experiment station was named for the method of research most prominent in the minds of those desiring to promote agricultural research when the Hatch Act was passed in 1887, so this section has been named to indicate the outstanding result which is popularly expected from the use of the accounting method.

The accounting method may be used extensively as in the surveys and the financial accounts, or more intensively as in the enterprise accounts and the detailed records of all the activities of the farm.

The accounting method throws much light on the farmer's problem of what to produce and how to produce it. Wherever the farmer has a choice between lines of production and between means to be used in production, accounting applied, not to farms in general but to his specific case, will provide some of the facts essential to a rational decision as to what to produce and the means to use in production in order to secure maximum profits under given conditions as to costs and prices.

Another aspect of this problem and one which has received much attention in recent years is the relation of costs to price. In our complex economic life with its high degree of specialization and division of labor both as between individuals and between regions, the view that competitive forces adjust prices in a manner fair and just has not been accepted for all conditions. On the other hand, the view has gained ground that where a group of men have made permanent investments in the agencies essential to producing an article, let us say milk for example, and where custom tends to bind the price of that article to an old level when all the elements of cost are rising, it is in the interests of sound public policy to adjust these price levels in such a manner as will preserve this production. It is believed that there are conditions where a public loss will be sustained if competitive forces are left to work in their slow and crude way to readjust the price level by destroying a part of an essential industry in order to force prices up

only to find that the whole industry was needed and that a period of great scarcity and unnecessarily high prices results from a shortage in supply.

Wherever the competitive regime breaks down the problem of fair price arises, and wherever the question hinges on fair price attention is turned to the study of costs. Thus it is the cost of production is in the foreground in this day of unsettled price conditions. In the minds of some accounting has failed to play a satisfactory role in this regard. The difficulty arises out of the fact that but little accounting had been done and that had been directed to the problems of farm organization rather than the problems of price regulation. With adequate funds the accounting method will render invaluable service in the study of the cost of production in its relation to the problem of fair price. The basic unit factors of production which will be ascertained for this purpose will serve not only for the emergencies when price regulation is necessary but also as an aid in constructive extension work in farm organization.

#### FARM ORGANIZATION

Farm organization, the second section in the committee outline, is the assembly plant where the results of research in the other sections and to some extent in other bureaus are brought together into a united whole for educational purposes. Here the point of view is that of the farm manager with all the conditions of his farm and community with respect to the land, labor and capital on the one hand and market conditions on the other forming the basis of decisions as to what to produce, how to use labor and equipment, how to determine the size of the farm and the intensity of culture in order to win maximum profits. Thus a highly perfected art of farm management is the goal of farm economics viewed from the standpoint of the individual.

It is not believed that these questions can be settled once for all and in general. The work is that of developing methods of analyzing the problem on the specific farm. Where this section leaves off is where the extension work begins, without which our work will be like a light hidden under a bushel. The task will be completed when each farmer has learned to figure for himself, so as to adjust his farming operations to ever changing conditions to secure maximum profits for himself and maximum economy in the nation's production.

#### FARM FINANCE

Farm finance is an important field requiring the attention of specialists in credit, insurance and taxation who are thoroughly cognizant of the farmer's conditions and needs and who for this reason are able to study these problems from the standpoint of efficient farm organization, land tenure and agricultural progress.

#### FARM LABOR

Farm labor is a subject which has received too little scientific consideration in this country. The five headings given in the outline are suggestive of some of the topics to be considered. The proper study of this subject will throw much light upon the farm labor question. The study of the farm labor problems in foreign countries will help us better to ap-

preciate our present labor conditions and to comprehend in some measure the trend of affairs. In some parts of this country the labor problem is closely associated with the tenant problem.

#### AGRICULTURAL HISTORY AND GEOGRAPHY

Agricultural history and geography has an important bearing on the study of various farm economic problems, but this is a subject-matter which requires to be built up by specialists through a series of years in order that the materials may be available for application in the solution of the great variety of problems which arise from time to time. The Atlas of American Agriculture is the important work in progress in this section at the present time.

#### LAND ECONOMICS

Land economics deals with a well-recognized group of problems which in the long run has a most profound influence upon the character of agriculture and the welfare of the agricultural population. Land is the farmer's savings bank. Whether or not the succeeding generations of farmers will be able to maintain their economic independence depends upon whether or not the distribution of the national dividend is such as to enable the farmer to save and invest in this bank enough to maintain control. There are immediate problems, such as better leasing systems, better methods of land settlement, a better understanding of a sound basis of land values and an improved national land policy which may be looked upon as the immediate results to be secured from work in this field, but the great significance of the work in land economics lies in the study of those subtle forces which may be slowly but certainly bringing about changes in the relation of the farmer to the land. A thorough understanding of these forces is essential to their control and their control is an essential part of a constructive policy for American agriculture.

#### FARM LIFE STUDIES

In farm life studies we come to the end in view in all efforts to improve agriculture. When the whole matter is sifted out it will be found that the conditions of living on the farm and in the rural community and the resulting attitude of mind of farm men and women toward their work and the land they till is at the root of the difficulties encountered in efforts to improve methods of farming and to promote the conservation of the land. In our efforts to secure better agriculture in order that we may have better living, have we not overlooked the fact that better living is one of the most potent means of securing the better agriculture? Attention has been focused too exclusively upon the field and the feed lot, the crops and the barns for storing them. The time has come for focusing upon the farm family, the unit of country life, and letting all these other matters find their proper places in the background of the picture. When this is done I am convinced that a new spirit can be breathed into scientific agriculture and it will become a living thing whose company will be eagerly sought. Those so-called leaders who say give us the dollars and we can do the rest are honest enough no doubt but they are mistaken. Study the history of individual farmers who have taken this view and you will find testimony in abundance



of the struggle for money accompanied by the doing without the comforts of life followed by a move to town so soon as a competence has been secured. This is unfortunate from at least two fundamental points of view. First, from the standpoint of the life itself for the long years of hard work and abstinence is all too often followed by disappointment in the seeking of satisfaction in retirement. Second, from the standpoint of the progress of agriculture this movement carries the best skill and judgment from the farm and shelves it where it renders no service.

What is needed is to make farming a business which can be carried on by people who are leading a satisfactory life while in the business so that each farmer may contemplate with pleasure a full life of activity on the farm under conditions such as will be attractive to his family. It has been demonstrated that this is a subject susceptible of scientific investigation. There are no lines of research more worthy of the state and federal research funds than the scientific study of farm life and the methods of making this life more attractive.

#### METHODS OF STUDY

One of the committees on reorganization reported on methods of research as well as upon the subject to be investigated. The methods of study were outlined as follows:

##### A. Survey method:

This method may be used in making such studies as—

1. Labor income.
2. Farm enterprises.
3. Farm practices.
4. Farm costs.

The value of this method depends upon—

1. Trained investigators.
2. Sufficient numbers of records.
3. Representative data.

##### B. Cost accounting method:

This method is valuable—

1. For providing basic unit factors of farm production, which are essential to the proper farm organization, such as—
  - (a) Labor requirements.
  - (b) Feed requirements.
  - (c) Material requirements.
2. As a check on more extensive methods of farm analysis and also to compare the results obtained by other methods.

##### C. Observation method:

This method should be of value when used as preliminary or supplementary to other investigational work. It should not serve as a basis for conclusions.

##### D. Geographic method:

This method is valuable as a means of contributing information concerning the physical and economic factors which influence farm organization—

1. Climate.
2. Soil.
3. Topography.
4. Transportation.
5. Marketing facilities.
6. Market prices.

**E. Historical method:**

This method is valuable—

1. As a means of understanding the development of the farming industry.
2. To assist in the interpretation of the trend of agricultural production.

**F. Statistical method:**

This method, although involved in the other methods mentioned, may be used as a direct means of studying farm organization.

This method may be used for such studies as—

1. Cycle of production.
2. Price relationship.
3. Types of farming.

**G. Experimental method:**

The experimental method may be used to advantage in the study of certain problems, such as—

1. The proper degree of intensive culture.
2. The right balance of enterprises.
3. The proper unit of organization.

While each method is especially fitted for the assembling of a particular kind of material and for this reason one method may contribute more to the solution of a given problem than another, all these methods are important and no final conclusions should be stated on any subject until every method has been used which can contribute to its solution.

#### DIVISION OF LABOR AND COOPERATION

The committee on reorganization recognized that the establishment of right relations with other workers in the field of agricultural research demanded the right application of the principles of division of labor and cooperation. This applies not only with respect to the division of subject-matter in the Department of Agriculture, among those trained in the physical and biological sciences on the one hand and those trained in economic research on the other, and the cooperation of these groups of specialists in bringing back to the farmers well rounded and well balanced answers to their question, but also to the question of cooperation between the economic workers in the United States Department of Agriculture and the various colleges and experiment stations.

The recommendations of the committee on reorganization, as amplified by the committee on farm organization, which relate to the question of cooperation with the federal and state workers in this field are as follows:

#### "COOPERATIVE RELATIONS BETWEEN THE OFFICE OF FARM MANAGEMENT AND STATE COLLEGES AND EXPERIMENT STATIONS FOR INVESTIGATIONAL WORK"

"It is recommended that the investigations of the Office of Farm Management requiring field work be carried on in cooperation with the State Colleges and Experiment Stations. Some of the benefits of such cooperation would be:

- (1) To prevent duplication and to correlate activities.
- (2) To promote the development of state departments.
- (3) To unify the methods and improve the general character of all farm management work.

"The following method of procedure in initiating relationships is suggested:

1. Projects for cooperative investigation may be proposed through either the proper administrative officers of the United States Department of Agriculture or of the State Colleges or Experiment Stations.

2. Personal consultation between federal and state representatives is advised in initiating all important phases of investigational work..

3. The College or Experiment Station and the United States Department of Agriculture should agree mutually upon the designation of an individual to act as joint leader of farm management and farm economic investigations for the State and the Department of Agriculture.

4. A memorandum of agreement should be drawn up between the United States Department of Agriculture and the State College or Experiment Station, embodying the following points:

(a) Cooperative relations and methods of work—

Cooperative investigations in farm management and farm economics should be established in the various States upon the most equitable basis possible, in view of the conditions that exist within the States and the United States Department of Agriculture.

(b) Personnel—

It is recommended that when investigators and employees of the Bureau of Farm Management and Farm Economics are assigned to a State for work, they shall be considered as members of the farm management and farm economics staff in the state institution concerned, and thus represent the United States Department of Agriculture and the State. Men selected for work in the State shall be approved by the contracting parties, namely, the United States Department of Agriculture and the State College or Experiment Station. In the event that institutions do not have a farm management and farm economics staff it is then recommended that any man assigned to work with the institution shall be considered a member of the investigational staff of the institution, his work to be administered in the usual manner in that institution.

(c) Approval of projects—

All projects undertaken by joint representatives or by investigators assigned to institutions shall be subject to approval by the interested authorities in the State concerned and by the Bureau of Farm Management and Farm Economics, United States Department of Agriculture. The projects within the State should be administered by the College or Experiment Station.

(d) Publication of data—

Data collected by cooperative effort should be equally available to both parties. Neither party should publish any of the data without consultation with the other party. In case of refusal to publish on the part of either party, the other party shall be free to publish the data on its own responsibility.

(e) Regional studies—

The larger regional or national projects undertaken by the United States Department of Agriculture shall be conducted in cooperation with the State Colleges or Experiment Stations included within the region. In initiating the cooperation, the various administrative officers of the States and the United States Department of Agriculture should be called together in so far as practicable to discuss the form of the project which shall be mutually undertaken. It is recognized that the prep-

aration and publication of material covering a region involving two or more States is peculiarly a function of the United States Department of Agriculture, and that the investigation may best be carried out through cooperation with the several States concerned."

It is with these plans drawn up largely by men from the various States that the representatives of the Office of Farm Management come to you as directors of experiment stations asking for cooperation in the undertaking of economic investigations. Whether or not some of the representatives of the federal office might prefer to be independent of state relations, economy and efficiency point to the wisdom of our joining with you on the plan here outlined or upon some other plan which can be devised.

It is our desire that the director of each station designate the person or persons with whom we are to establish cooperative relations. The work in farm management and farm economics is organized differently in different institutions. It is not our purpose to have anything to say about your form of organization. Our one desire is to have a definite point of contact through which we can establish cooperative relations. In carrying out the work it is our desire to put the cooperation on a fifty-fifty basis so far as finances are concerned. The plans will, of course, be worked out jointly and it is our desire that the responsibility of carrying out the work from day to day and month to month shall be shouldered by the state project leader.

Never before were farmers more interested in economic questions. Leadership in thought as it relates to the economic forces with which the farmer has to deal is the duty of the experiment stations and the United States Department of Agriculture working cooperatively and harmoniously. With the thinking right the actions will not be far wrong, let the leadership in action be vested where it may. I should prefer to see the leadership in action vested in the farmers themselves, ever looking to the educational institutions for inspiration and facts which will direct their action to fruitful results.

My attention has been called to a movement to have the farmers raise funds and establish a farmers'-university devoted to research and education in the field of agricultural economics. I trust this call is more a manifestation of interest in the subject and of impatience due to the slowness with which progress has been made than lack of confidence in the integrity of research work done by the experiment stations.

It takes time to train men for leadership in economic thought. This is the most difficult of the tasks undertaken by scientific workers in the field of agriculture. The danger is not so much in the slowness of the development as in failure to appreciate the importance of taking the precaution that solid, permanent work be done.

Economic questions are dealt with by everyone and in the absence of scientific results everyone feels his opinion is as good as the next one's. The danger is that men holding high positions in the field of agricultural education and research, but who are without training in economics, shall presume to lead thought in this difficult field. What is needed is a careful study and adequate presentation of facts on questions of this kind in order that truth rather than opinion may be presented in a form that it may become the basis of making improvements. Here is a large field of usefulness for the student of economic problems in the experiment stations

and in the United States Department of Agriculture. Let us work together with the hope of directing thought into lines which will lead to rational action and to a solution of those economic questions which confront the American farmer, the right solution of which will go far to determine the course of American civilization.

#### REPORT OF JOINT COMMITTEE ON PROJECTS AND CORRELATION OF RESEARCH

F. B. MUMFORD of Missouri, presented the report of the Joint Committee on Projects and Correlation of Research. (For text see page 62.)

R. W. THATCHER of Minnesota. I am heartily in favor of an arrangement of the kind suggested in this report, but some means should be provided at the outset to assure us that the responsibility for the activity of the proposed council of agricultural research lies equally with this Association and with the Federal Department. We have been disappointed in one case in the outcome of a joint responsibility of this kind, namely, the Journal of Agricultural Research. In this case, changes in policy with reference to frequency of publication, etc., have been determined solely by the Secretary of Agriculture on the basis of temporary changes in the funds available, rather than by joint consent of the two cooperating parties. There is some danger that a joint agricultural research council might perhaps work out in the same way. One example of successful cooperation, namely, that secured through the States Relations Service, is, of course, backed by continuing appropriations, thus avoiding the danger that work well established will be suddenly discontinued.

H. L. RUSSELL of Wisconsin. The necessity for something of this sort has impressed itself upon the minds of many experiment station directors during the last eight or ten years. At one time the suggestion was made that a permanent Assistant Secretary of Agriculture be appointed whose entire time should be given to the consideration of research problems not only in the Department of Agriculture but in its cooperative relations with the stations. The committee's proposition if put into effect would greatly enhance the value of our research work.

J. G. LIPMAN of New Jersey. There is a fairly general feeling that we are not truly directors of research as we should like to be, for the reason that the experiment stations have come to be rather complicated institutions and the burden of administrative work is quite heavy. Furthermore, the variety of research problems at most of the experiment stations is rather considerable. Hence the feeling has been growing that if we could perfect our organization by having a body of men sufficiently protected from distraction by other kinds of service, who are selected for their training and personal ability to give thorough study to the projects of research, in a sense it would supply a link which is now missing in the research machinery of the experiment stations and the Federal Department. I favor the recommendation of the Committee that there be organized a group of men possessing adequate technical training whose time would be spent in the careful study of the more important investigational work of the Department and the stations with a view to the conservation of their energies and funds. They might also consider the desirability of exchange of investigators among the research institutions. For example, in soil fertility problems, we might detail members of the staff of one institution to spend a certain portion

of their time at other institutions, in the study of the same problem or some portion of the same problem with which they were working at home.

C. G. WOODBURY of Indiana. I would favor anything that would tend to unify and simplify the relations of the stations to the Department in research matters. I believe that feeling is quite general. I would like to see some action taken by this section. Might we not request the Executive Committee to take steps looking toward the inception of some such scheme which it might work out in consultation with the Secretary?

H. J. WEBBER of California. I favor the proposed plan but question whether it is likely to go far enough in the fundamental reorganization of research.

On motion, the recommendation of the Committee regarding the formation of an agricultural research council was approved by the section and referred to the general session.

The recommendation of the Committee on Graduate Study that the Graduate Summer School of Agriculture be definitely discontinued (see page 20) was considered and approved. Its further recommendation with reference to the establishment of graduate fellowships in agriculture (see page 20) was disapproved.

The recommendation of the Executive Committee concerning dues for the coming year (see page 19) was approved.

On motion, a recess was taken until 2 P. M., Thursday, November 13.

#### AFTERNOON SESSION, THURSDAY, NOVEMBER 13, 1919

The Section was called to order at 2 P. M. by the Chairman.

#### PUBLICATION OF RESEARCH

H. P. ARMSBY. May I again call attention to that portion of the report of the Joint Committee on the Publication of Research, in which was discussed the reduction in size of the Journal of Agricultural Research and its effect upon the publication of the research work of the experiment stations (see page 138). The present situation seems most unfortunate.

W. H. JORDAN of New York. The Executive Committee took this matter up with the Secretary of Agriculture. It appears that the printing fund appropriated by Congress for the Department of Agriculture was reduced from \$650,000 to \$600,000 and that the Journal of Agricultural Research was reduced to about one-fourth of its previous size. The Assistant Secretary said that we could count on the reduction as being temporary; and I think we want to look at it from that point of view.

A. C. TRUE of Washington, D. C. This is simply one phase of a general situation in the Department of Agriculture. The result of the reduction in the printing appropriation and the increase in the amount of money which is spent by the Department on general publicity has brought about a serious reduction in the printing fund available for research publications.

During my entire experience in the Department there has been nothing like the present situation. The States Relations Service estimate for printing this year was \$55,500, our allotment was \$34,500. The Experiment Station Record absorbs more than half of the total amount. We have to prepare and print reports to Congress on the experiment station and extension work. A certain amount of job printing has to be done. When those items are taken care of little or nothing is left for the publication of technical bulletins, such as those on agricultural education, home economics and the like. The amount which Congress now allots to the Department for printing is entirely inadequate in view of its increased cost. I should be glad to have this section express itself, if it feels so disposed, with reference not only to the Journal of Agricultural Research, but to the publication of the research work of the Department as a whole.

A committee of three, consisting of Directors W. H. Jordan of New York, C. P. Gillette of Colorado, and C. E. Thorne of Ohio, was appointed to consider and recommend action by the section on the question of the publication of research. The committee reported as follows:

*Resolved*, That this Section respectfully urges upon the Honorable Secretary of Agriculture the desirability of bearing in mind the allotment of the funds used for printing, and the need of furnishing adequate facilities for the publication of the results of scientific research in agriculture. Such research is the necessary basis for resident teaching and extension work and for the efficient administration of many of our laws. Especially do we stress the value in this respect of the Journal of Agricultural Research and the Experiment Station Record.

W. H. JORDAN,  
C. P. GILLETTE,  
C. E. THORNE.

The recommendations of the committee were approved by the section.

#### REPORT OF COMMITTEE ON STATION ORGANIZATION AND POLICY

The report of the Committee on Station Organization and Policy was presented by E. W. Allen of Washington, D. C. (For text of report see pages 128-136.)

W. H. JORDAN. I have studied with much interest the report of the Committee on Station Organization and Policy for 1918. Much of it is given over to the consideration of the function of the colleges under the changed conditions of our times. Concerning this part of the report I have no comments.

A discussion of experiment station activities may conveniently be classed under two headings, the fields of inquiry and the manner of attack of the problems. It does not appear evident that there are any new fields of inquiry into which the stations have not already entered, with the possible exceptions of rural economics and the use of fuel energy as supplementing farm labor. It is possible that these two phases of inquiry have been given some consideration. The changed economic conditions seem to demand that we shall stress more fully certain phases of inquiry which have not been wholly neglected in the past.

Unquestionably the high prices of fertilizers and feeds suggest greater attention to the conservation of the resources of the farm. This conservation will be exercised principally along two lines—more careful development and preservation of plant food and the application of more intelligent methods to the production of farm crops as a means of sustaining the dairy or other animal husbandry. Let me illustrate by merely mentioning the question of the preservation of farm manures. More or less attention has been given to this subject, but the investigations which I have noticed do not seem to have followed the problems to their ultimate solution. The research has not been sufficiently comprehensive and severe.

The soil is a fundamental fact in plant production, but we are still very far from comprehending the influence of the various factors which determine fertility. There is still opportunity for useful studies in the economics of animal nutrition, although this subject has business phases which will most definitely be settled for each farmer and each locality through the observations of practice.

The report of your Committee for 1918 gave much attention to the question of rural economics. I am not yet convinced that this is a field into which many stations can profitably enter in the way of independent researches. The complex relations of the subject and the type of investigator demanded indicate to my mind, as I have stated once before in your presence, that a central bureau will more efficiently study these problems from the national aspect, indeed even from the regional aspect, than can individual experiment stations. Undoubtedly the stations could well assist in the collection of data, but the formulation of conclusions from these data should be accomplished by the ablest talent in the field of economics that the country possesses—men who as a rule are out of the reach of our individual experiment stations.

The application of fuel power as an amendment to animal or hand labor on the farm is properly a subject for an engineering experiment station. Anyway it is one that should be handled by trained engineers. Doubtless some experiment stations could profitably cooperate with the engineering departments of the colleges in the solution of this problem. We must not forget, however, that it rests largely upon the type of machines used and the construction problems lie with the manufacturing companies.

The method of attack of the problems which we study is a matter of great importance. I wish to emphasize the suggestion made by your Committee for 1918, which I quote: "This demand for definite information for the guidance of the farmer and his advisors will suggest intensive studies covering restricted fields, and it will call for methods competent to give less complex and indefinite results which may be more readily and directly interpreted." A very just criticism of the work of experiment stations in the past is that experiments have been carried on, so complex in regard to the various factors that have reacted upon the result, that no safe conclusions could be drawn in regard to the influence of any one factor. This is true of a large proportion of the field experiments and feeding experiments which have been conducted. We have devoted altogether too much time and means to business problems, the outcome of these inquiries being nothing more than an determination of profit and loss under conditions which might not be duplicated elsewhere. If there is any one point of view



which needs to be enforced by our experiment station administrators, it is that we shall narrow our problems, as, for instance in soil studies, to single factors. We will make little progress until we do this. This is true of the whole field of investigation, whether with soils, in nutrition, in our defense work or in agricultural technology.

There is but one more point which I desire to notice. This is covered by another statement made by your Committee for 1918, that "all of these things call for a type of administrative leadership in the stations, both competent to guide scientific investigation and with sufficient time for the thoughtful study of work and plans." An experiment station is entitled, if its best interests are to be conserved and its work made as efficient as possible, to have an administrative head who has no other duties. Moreover, he should be a man who has actually engaged in research himself. It makes little difference what the field of research is in which he has been active provided he has come to comprehend sound methods and has acquired an active appreciation of the care and severity with which inquiries should be prosecuted. It is, in my judgment, a mistake to combine with the duties of director, teaching duties or other administrative functions.

C. F. CURTISS of Iowa. Last year we heard a good deal about the reconstruction of American agriculture. It does not appear that there is very great need of reconstructing American agriculture. The agricultural industry, I think, adapted itself more readily, more quickly, responded more fully to war conditions than any other great industry. Since the close of the war I think that the agricultural industry has shown its ability to readjust itself and get back to normal conditions more readily than any other great industry.

The committee's report of last year was broad and, I think, presented some very interesting views of the problems before it; but I do not think, nor do I believe the Committee thought, that there was need for any radical reorganization or redirection of station policies or station work. I am fully in accord with the Committee in the statement which it made to the effect that there needed to be intelligent development and directing of station forces along the line of specific needs and adaptation to the fields within the State. I think that the conditions growing out of the war served as a factor in bringing about that result on the part of the work of stations to a very great extent; perhaps to a greater extent than occurred in any previous period. I do not think there is need of very great modification in the station policies or in general in the agricultural policies of the country at the present time. Of course, there may be some change of practices that will come as a result of war conditions. Here is one specific instance. If the price of feeding stuffs should remain on anything like the present level it may change agricultural practices in some such way as this. It has been the custom almost uniformly in filling silos to use both corn and stover. If corn should continue at present prices, or even above \$1 a bushel, it is a question whether it may not be a better agricultural practice to use only the stover for filling the silos and utilize the grain separately from the stover. That question has already been raised by some stations and some investigations are being conducted along that line. I think it is a very important question.

It has been suggested that the higher prices of land will result in a more intensive form of agriculture. That may seem true, yet when we come

to consider it carefully and study the results I am not sure that it will be true. I have not seen very much change or development in that line. On the contrary, the farms in many of the agricultural States have been growing a little larger rather than smaller. We have not been able to increase the amount of human labor, the man power on the farms, and increase the output as they have in many European countries, and in connection with the present advance in land there are other factors at work. It is costing as much as \$10 per day in a good many instances to get corn huskers at the present time. Unheard of prices are being paid for farm labor. The cost of operating farms has increased more than the value of the farms has increased. We may not be doing more intensive farming. It is altogether probable that we will not do more intensive farming unless we are able to do it by means of improved machinery and more mechanical or horse power. We are not going to be able to apply profitably more human labor on the farms unless conditions materially change.

I am fully in accord with that part of the committee's report which emphasizes the importance of the study of economics in relation to agriculture. I do not believe that there is a single need before the experiment stations today that is so urgent as research in agricultural economics. The conditions that have grown out of the war and the changes that we are now going through emphasize as never before the importance of the study and application of sound principles of agricultural economics. Much of this kind of work should be done by men connected with our colleges and experiment stations. It is not a field that all stations should enter, but I believe that the work needs to be more closely connected with our colleges and the research work of our experiment stations than it has been in the past. The great trouble with the economic work of this country thus far is that it has not been hitched up closely enough to agriculture. Men have not fully realized or grasped the agricultural problems before them. I think there should be at least a moderate number of institutions developing stronger departments of rural economics for research work and for training educational workers in that field. Probably there is no other field today in relation to agricultural instruction or research in which there is such a dearth of well trained men. I do not think that we will get far with solving some of the great problems of vital importance before the country until we have sound or fundamental information concerning this important subject. Yet it seems to me that we have even more information now than is being intelligently used in all cases. Take, for instance, the campaign against profiteering in food stuffs that was started recently. That developed, I think, and was put into operation without any consideration of economic principles relating to agriculture. We are dealing with the organization and policy of experiment station work. I think the government heads at Washington ought to consider organization and policy and coordination of work of some of their divisions. I believe that the starting of the kind of a campaign against profiteering that was undertaken, one of the first moves of which was to prosecute men for storing food stuffs without reference to the question whether they were being stored for profiteering purposes or legitimately as a part of a sound policy in agriculture, was a menace to American agriculture. It resulted in reducing the price of some food stuffs in a very marked degree to the producer and without any corresponding benefits to the consumer. If the principles of economics in

agriculture had been taken into account it would have been found that the storage of food stuffs, the holding of surplus quantities of food stuffs in cold storage, at seasons of the year when there is a surplus, was an essential part of our industry and that it results in stabilizing prices rather than enhancing them. Likewise it would be found that there are certain lines of the producing industry relating to agricultural products and other food stuffs as well, that must necessarily carry food stuffs in cold storage until a time when there is a lesser production. This whole field of the importance of agricultural production, marketing, distribution and placing of the food products within reach of the consumer on sound and economic principles, is one that needs to be most carefully investigated and our colleges and stations are the best agencies extant to make such studies. I repeat that I am very fully in accord with the committee's position on that subject. I hope that it will be emphasized until that field is as well covered as are many of the other lines of agricultural investigation.

I am sure that all those connected with the administration of station work will find themselves in hearty accord with the recommendations of the Committee regarding the strengthening of research work. I question if there has been a time within a quarter of a century when research work relating to agriculture in this country has faced such critical conditions as it is facing today; and while those conditions also affect the instruction and extension work, I think from the experience we have had in the past, we will find the other lines recovering more quickly than the research work. The review of the situation at the various experiment stations indicates that research work has not received proper emphasis and support in many states and that it has worked under serious handicap in many other states. The fact that the instructional work and extension work have grown so rapidly has of itself proved a menace to station work. It ought not to be so, but usually it works out that way. Many men have been withdrawn from the research field and became administrative officers. The work of many of our most important investigators has been curtailed or almost eliminated. Perhaps that is an inevitable result which we can not fully avoid, but I think we will need to place greater emphasis upon experiment station work than ever, to give it a more prominent place, a place of higher recognition in our general scheme, and to make it more independent of instructional work.

The importance of separating the work of a station director from instructional or extension work has been emphasized. I can see that there is an advantage in that, but I think there is even a greater advantage in separating the work of the research man in agriculture from instructional or extension work. The director is an administrative man. He can divide his time more readily and more efficiently, I think, than the man who is trying to do research work, educational work and extension work. While I do not think that heads of department should be divorced from the research work, I believe that their connection should be largely administrative in character and that men should be employed there with distinctive qualifications and training for the research work and their time devoted to it exclusively. I think we must have a force of that kind in our institutions before we will have our work established on a sound basis, and I think the position of those research men who have established themselves and their qualifications should have corresponding rank with that of the heads of the de-

partments. I do not mean by that that they should be independent of the heads of the departments, on the contrary, they should be associated with them, but their work ought to stand out distinctly. There are men all over this country who have made a greater reputation in five or ten years of agricultural research work than their administrative officers have made in a good part of their lifetimes.

THE CHAIRMAN. "Additional Federal Support for Experiment Station Work" will now be discussed by Directors R. L. Watts of Pennsylvania and E. A. Burnett of Nebraska.

#### ADDITIONAL FEDERAL SUPPORT FOR EXPERIMENT STATION WORK

BY R. L. WATTS

Should additional federal support be provided for experiment station work? The answers to Director Burnett's questionnaire indicate that most experiment station directors answer this question in the affirmative. The whole problem needs careful consideration by this body. I shall merely open the discussion, to be followed by Director Burnett and others.

First: Does the Federal Government possess a consistent policy with reference to the advancement of agriculture and agricultural education? For more than 50 years Congress has expressed its interest from time to time in a very substantial way, by appropriating funds for the work of the Land-Grant Colleges. When the various Acts are considered, it is evident that the Government has realized the importance of promoting agriculture by means of education and research, that it has possessed a policy. The earlier enactments revealed its attitude toward agriculture during pioneer days and the Smith-Lever and Smith-Hughes Acts sets forth its views as to the importance of scientific agriculture to our national welfare. It is universally admitted that agriculture is the most important industry in any country, whether in time of war or peace, and our own country is thoroughly committed to a policy of promoting the highest type of farming and of rural life.

Second: What is the weakest link in the chain of our work? Should Congress give further financial aid to college instruction, to college extension or to station research—to one, two, or all of these activities?

The colleges have greatly improved their agricultural instructional work. They are succeeding admirably in the training of rural leaders and better farmers. The Smith-Hughes funds are giving a great impetus to teacher-training work and to the vocational school movement. The accomplishments made possible by the Smith-Lever Act are familiar to us all. But how about agricultural research? Is not this the weakest link in our agricultural program? It is 13 years since Congress appropriated additional funds for research, and the amount thus furnished is a mere trifle compared to the sums that many states receive for agricultural extension and teacher-training purposes.

Furthermore, should we not take into account the fact that there are many extension and teaching agencies, such as the colleges, state departments of agriculture, vocational schools, agricultural high schools, the common schools, farmers' institutes, farmers' clubs, granges, commercial establishments and organizations which maintain extension departments, and that millions of copies of agricultural papers circulate every week in

rural communities? The function of all these agencies is to teach agriculture and they are constantly seeking reliable information on every branch of farming, marketing, cooperation, rural organization, etc. These numerous agencies cannot continue to render efficient service without a greatly enlarged program of experiment station work. Information on the most ordinary questions is lacking. And yet there are only two public research agencies, the United States Department of Agriculture and the experiment stations; and both should be liberally supported.

Third: While the grant of federal funds for extension purposes is exceedingly gratifying, should there not be a material increase in the appropriation of money for purposes of research? The Smith-Lever Act provides for \$4,580,000 for extension, while the Hatch and Adams Acts grant a total of only \$1,440,000 for research. In other words, for every dollar of federal money devoted to research about \$3.90 are available for extension. And research is an expensive proposition. Unless the States make good the shortage how can the agricultural program satisfactorily advance?

Fourth: Do the stations have adequate funds for the initiation of new projects? The tabulated answers to the questionnaire indicate that few stations have sufficient money to undertake even the most urgent new projects.

Fifth: Do station directors want additional federal support? All but one or two resemble Oliver Twist.

Sixth: If additional federal support should be granted for experimental purposes what should be its basis? Should an additional and equal sum be provided for each state as in the Hatch and Adams Acts, or should the grant be based on the rural population of each state, as provided in the Smith-Lever and Smith-Hughes Acts? Some state legislatures are making very liberal appropriations to their experiment stations, others give little or nothing. The state legislatures which have recognized the importance of agricultural research by making substantial appropriations for this purpose are to be commended, and the stations receiving such aid are to be congratulated. It is unfortunate, however, that this situation does not exist in all the States, and the problem which we should consider is: What can be done, as a national proposition, to secure the much-needed funds for research in all states?

While I feel that the Federal Government should make additional grants for research work, I feel that each state should provide a sum equal to its federal allotment, and that the distribution of the federal funds should be based upon the rural population of each state, as stipulated in the Smith-Lever and Smith-Hughes Acts. Furthermore, in view of the fact that the instructional and extension agencies are so numerous and since there is such a pressing demand for additional information in every direction, the total federal appropriation for research should at least equal that provided for extension.

The scope of the Hatch Act is broad. It was passed "in order to aid in acquiring and diffusing among the peoples of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigations and experiment respecting the principles and applications of agricultural science." We find in this Act strong argument for seeking further appropriations by its amendment rather than

by the introduction of a special and separate measure. It allows large administrative discretion to the States. However, the principles of the Smith-Lever Act relative to the ratio of the rural population should be recognized and provision made that the States appropriate amounts equal to those received of the Federal Government. It is important, moreover, that such an amendment should not in any way affect the present federal research funds. If it is conceded that the federal funds now available for extension work in agriculture and home economics should be matched by federal funds for investigation, such an amendment would carry \$3,440,000, to be allotted to the several States according to their rural populations. The amendment should make it possible to conduct investigations in rural economics, rural sociology, rural education and home economics, unless provision is made for the line of work in a separate measure.

#### NEW FEDERAL APPROPRIATIONS FOR EXPERIMENT STATIONS

BY E. A. BURNETT

The income of all public institutions with stationary appropriations is now cut in two. At the beginning of the war the per capita circulation in the United States was \$34.53 while at the present time it has increased to \$54.03. This expansion in the circulating medium, together with the scarcity of labor, has had the effect of doubling the cost of everything a station buys, except possibly labor. Salary increases, however, are not proportionate to the higher cost of living. This situation has resulted in reducing the station output. In many states station work has practically been cut in half. When projects have been completed no new ones have been undertaken, and in many cases projects are inactive because of lack of funds. Stations enjoying increased state support are more nearly able to meet the public needs than those not thus favored, but even these as a rule find their income to be inadequate. Furthermore the Smith-Lever Act made large sums of money available for extension work. The experiment stations with stationary incomes then came into competition with the extension services whose incomes were liberal and expanding. Such a condition centered public attention upon the extension service and prevented the experiment stations from securing locally the additional support which they might readily have received had it not been for the federalized support and rapid growth of extension work. This problem was still further complicated by the war. Emergency funds in large aggregate amounts were allotted to the extension divisions for conservation work. Men were withdrawn from the experiment stations and the colleges to be replaced with untrained men. This statement of fact is no criticism of the extension workers, who have performed a magnificent service under the stress of war. However, it emphasizes the large demands which are being made upon our Land-Grant Colleges by the public and impresses the stations' need for better trained men and more ample facilities.

It was providential that in the great crisis of war the experiment stations had many years of careful investigation to their credit, that they had accumulated a vast fund of scientific information, the value of which the people of the United States has not as yet fully appreciated. The

extension services made excellent use of this mine of wealth, bringing it to public attention in a most effective manner, "cashing in" within a brief period of time information which had lain idle or partially used for many years. However, these new avenues of publicity have opened so widely that propaganda has now outrun the accumulation of data and as a consequence there is a dire need of a revival of station activities.

A brief survey of the funds available for investigational and extension work will indicate the relative positions of these two lines of land-grant college activity and throw some light upon the necessity for increased station support.

The Hatch Act was passed in 1887. It appropriated \$15,000 to each state. The Adams Act was passed in 1906, and increased each station federal appropriation to \$30,000 annually. The total annual federal appropriation for station work is \$1,440,000. No increase has been made during 13 years; yet meanwhile the cost of production has tripled and that of scientific apparatus has often more than tripled.

The Smith-Lever Act was passed in 1914. It appropriates from the federal treasury for the current year \$4,580,000 and requires, in addition, state appropriations of \$4,100,000 to make available the full federal appropriation. The total is \$8,680,000. The Act provides that over and above an initial \$10,000 federal appropriation to each state, the State shall match the federal appropriation dollar for dollar.

A hasty and somewhat general survey, made by sending a questionnaire to each station director, shows that the state appropriations available for the experiment stations are approximately \$3,620,000, which, added to the federal appropriation of \$1,440,000, gives a total of \$5,060,000 devoted to station work as compared with \$8,680,000 used for extension purposes. Practically \$2.50 of state funds are available for experiment station work for each dollar of federal funds, while for the extension work the Federal Government appropriates more than a dollar for each state dollar required. Congress has been more generous thus far to extension than to research work, which leads the writer to feel that a more liberal and adequate support of the stations might now receive favorable consideration at its hands.

It is fair to say that the method of cooperation between the State and the Federal Governments as it applies to the Smith-Lever funds for agricultural extension and the Smith-Hughes funds for agricultural education, represents more nearly the present view of Congress and of the federal authorities than does the method which was inaugurated in 1887 when the Hatch Act was passed. If this more modern policy of cooperation between the States and the Federal Government is to hold in any new legislation in behalf of research work, the funds which would become available for that purpose would be much increased.

State legislatures are besought at every hand for more money. State governments require increased revenues. All educational institutions are appealing for increased funds. Many of the newer state activities receiving federal support must needs match federal dollars with state dollars as a precedent to the receipt of the governmental funds. It is hardly to be expected then that the stations will receive further consideration at the hands of state legislatures until extension and vocational educational monies

are covered by equivalent state appropriations. Furthermore, many station administrators have only very indirect approach to their legislatures and many of those who do enjoy such access feel that larger, and perhaps conflicting, interests are involved. It thus becomes difficult to make appeals in behalf of station work except in connection with requests for large support for the parent college or university.

In most states the stations are marking time, on half rations, little new work is being inaugurated, station men are deserting and going into business enterprises, and few trained men are being recruited. Our students no longer look toward research but toward business and commercial activities. Less work, less interest and relatively less efficiency are the evident result. Only one thing can avert the catastrophe. More money is needed, sufficient adequately to pay for the service of trained men and to equip laboratories; and a campaign must be entered upon to infuse new life and energy into station work. Federal assistance contingent upon state aid will do this, and adequate state appropriations will effect the same result.

The committee's suggestion that Congress be asked to duplicate the Hatch appropriation, subject to a like sum being provided by the State, offers some measure of relief to the smaller states and would be of material assistance to all. The amount involved, however, is not sufficient. It would not materially increase the funds available for experimental work. Sufficient state appropriations to match such an increase are probably now in hand in 40 States. It is likely that some states would not ask to match the federal appropriation with appropriations now made to the state for investigation. Many states might be induced to afford local aid in excess of the amount required by Congress. If the amount secured in this way is insufficient, Congress might possibly be induced to duplicate the Adams appropriation under the same terms. Each increase would add a few thousand dollars and each would materially aid the present condition; but neither alone would provide sufficient funds to place station work the country over on a sound basis.

Through the efforts of this Association an appropriation should be secured for research work comparable in amount with the funds available for extension purposes, unrestricted by hampering regulations tending to impair its usefulness for research purposes. Of course adequate supervision similar to that now exercised by the Office of Experiment Stations would be provided. This Section should recommend to the Association that some such action be taken at the earliest possible date.

On motion, the Section adjourned *sine die*.



## SECTION OF EXTENSION WORK

AFTERNOON SESSION, WEDNESDAY, NOVEMBER 12, 1919

The Section was called to order by the Chairman, Director C. S. Wheeler, of Ohio State University.

**THE CHAIRMAN.** An informal conference of extension directors, of state agents and extension officials of the Federal Department of Agriculture was held yesterday, centering about a meeting of the Committee on Extension Organization and Policy. It considered various matters relating to extension work and especially the need of increased federal appropriations. Considerable attention was given to the specific uses to which such funds should be devoted if they were made available.

At this conference a committee, consisting of Vice-Director M. C. Burritt of New York, and Directors G. I. Christie of Indiana, and B. W. Kilgore of North Carolina, was appointed to collect information from the various extension services touching the need for and the proposed uses of additional funds and instructed to present its findings to the Executive Committee.

On motion, the proceedings of the informal conference and its action as above stated, were approved.

**THE CHAIRMAN.** The program of the afternoon will center about the discussion of two questions, namely: To what extent is extension work modifying farm practice and country life; and the general scheme for carrying on extension work with women.

Mr. C. B. Smith, Chief of the Office of Extension Work, North and West, will open the discussion of the first named topic.

### THE EXTENT TO WHICH AGRICULTURAL EXTENSION AGENCIES ARE REACHING AND INFLUENCING RURAL COMMUNITIES

BY C. B. SMITH

In the summer of 1912 the Office of Farm Management, of the United States Department of Agriculture, made a cross-country survey in several of the Eastern, Central and Southern States by means of agents who went afoot or on motorcycles and interviewed farmers on both sides of the road to learn to what extent farm practice was being modified by the publications of the Federal Department of Agriculture, the State Agricultural Colleges, the farmers' institutes, the agricultural press, etc. The results of that survey have been published in U. S. Department of Agriculture, Bureau of Plant Industry, Circular 117. Since 1912, the Cooperative Agricultural Extension Act of 1914 has been put on the federal statute books and our present intensive system of agricultural extension worked out, including the establishment of practically the entire county agent system in the Northern and Western States, home demonstration work, boys' and girls' club work, and a very great increase in the work of extension specialists. Since this work has been in process of development for a number of years, and, in many states has to a considerable degree reached sub-

stantial maturity, it seemed desirable to make another inquiry direct to the farmers somewhat paralleling the survey of 1912 in order to learn from them to what degree our different agricultural agencies were functioning in their respective communities.

Accordingly, four agents travelling by automobile or motorcycle made a house to house canvass of farmers on both sides of the road in four separate regions. One of the agents travelled from Washington north through Pennsylvania, northeast through New York into Massachusetts, coming back by way of New Jersey; another started at the eastern boundary of Ohio, went west across Ohio, Indiana and Illinois and part way back again; the third started out from a point in Southwestern Wisconsin, going into Southern Minnesota, and part way back through Iowa; another started from San Diego, travelled the whole length of California, across Oregon, into a part of Washington, southeast through Idaho, and a little way into Utah. In all 2,301 farmers were interviewed, using the following outline of questions. The routes were so planned that 142 of the 143 counties visited had county agents who had been at work on an average of three years, 102 of them had home demonstration agents who had been at work on an average 1.4 years, and 52 counties had had county club leaders who had been at work on an average of one year.

COPY OF SURVEY BLANK FORM USED

No. ....	Date .....
State .....	County .....
Name .....	R. R. No. ....
Town .....	
Owner .....	
Renter .....	Type of Farming .....

1. How long have you lived in the community? .....
2. Do you know the County Agent? ..... Home Demonstration Agent  
County Club Leader? .....
3. What work has been undertaken on your farm or in your home at the suggestion of:
  - (a) County Agent:
    - (1) .....
    - (2) .....
    - (3) .....
    - (4) .....
  - (b) Home Demonstration Agent:
    - (1) .....
    - (2) .....
    - (3) .....
    - (4) .....
  - (c) Boys' and Girls' Club Leader:
    - (1) .....
    - (2) .....
    - (3) .....
    - (4) .....
4. Are you a member of the Farm Bureau? .....
5. How has the Farm Bureau been of benefit to you? .....
  - (a) Program for agriculture and home improvements? .....
  - (b) Farm Bureau publication? .....
  - (c) In a cooperative way? .....
    - (1) Farmers' exchange? .....
    - (2) Cooperative associations organized? .....
  - (d) Any other way? .....
6. Have you attended any Extension Schools? .....
 

What work has been undertaken on your farm or in your home at the suggestion of these schools? .....
7. Do you attend Farmers' Institutes? .....
 

What work has been undertaken on your farm or in your home at the suggestion of these institutes? .....
8. Has any Extension Specialist visited you? .....
 

What help in your farm and home work did you get from these visits? .....
9. Is there any farm in your community carrying on
  - (a) Any demonstration work in agriculture? .....
  - (b) Home demonstration work? .....
  - (c) Boys' and girls' club work? .....

10. Have you visited such demonstrations? .....  
     Do you think its teaching practical? (a) .....  
     (b) ..... (c) .....  
     Are you putting them in practice? (a) .....  
     (b) ..... (c) .....
11. Do you get the Bulletins of the Agricultural College? .....  
     of the U. S. D. A.? ..... (a) What proportion of these bulletins do  
     you read? ..... (b) What work has been undertaken on  
     your farm or in your home at the suggestion of these bulletins? .....
12. What papers do you read? .....  
     Daily .....  
     Weekly .....  
     Agricultural .....  
     Magazine .....
13. Of what agricultural organizations or clubs are you a member? .....
14. In what way has each of these organizations benefited you? .....
15. Of all these agencies (county agents, home demonstration agents, boys' and girls' club leaders, farm bureau, extension schools, institutes, specialists, bulletins, papers, agricultural organizations) which do you regard as most help to you:  
     (a) On farm—  
     (b) In home—
16. What is the biggest problem of the farmers in your community today?  
     .....  
     What are the objections to or commendations of the extension work?  
     .....

The distribution of the records taken, as regards Eastern, Central and Western States, and the number of county agents, home demonstration agents, and boys' and girls' club agents that were at work in each of the sections are shown in the following table:

NUMBER OF AGENTS AND LENGTH OF SERVICE IN AREAS VISITED

GROUP	County Agents		Home Demonstration Agents		Club Leaders	
	Number of agents	Service in years	Number of agents	Service in years	Number of agents	Service in years
Eastern	26	3.8	22	1.7	10	.9
Central	59	3.	31	1.2	13	1.
Western	57	2.6	57	1.3	29	1.
Total	142	3.	110	1.3	52	1.

Attention is again called to the fact that every county passed through, except one, had a county agent who had been at work on the average for three years; that only about two-thirds of the counties had home demonstration agents who had been at work for less than a year and a half; that practically only one-third of the counties had a county club leader and these leaders had been at work on the average for but one year. In interpreting the results which appear in the following tabulations, therefore, there must be kept in mind the relatively smaller number of counties with home demonstration agents and club agents and the much shorter period in which these forces have been at work as compared with the county agent group.

Only the more significant features of the survey will be presented. One of these relates to the number of people who knew the different extension agents in the county—either by having met them, heard them lecture, or received letters from them with reference to some agricultural problem. The following table shows the number of farmers interviewed who knew the demonstration agents:

**PERCENTAGE OF PEOPLE KNOWING THE DEMONSTRATION AGENTS  
IN AREAS VISITED**

STATES	Number of records taken	Know county agent %	Know home dem. agent %	Know club agent %
Eastern	387	67	22	10
Central	994	62	6	8
Western	920	73	20	14
Total	2301	67	14	9

The above table would seem to indicate that practically two out of every three people interviewed knew the county agent, one out of every seven knew the home demonstration agent and one of every 11 knew of the club work. The relatively small number who knew the home demonstration agent and club leader is at once apparent and is due undoubtedly to the fact that there were relatively few of these agents and that they had come into the work but recently.

One of the questions asked had to do with the objections to or the commendations of the extension work. A summary of the replies to this question is shown in the following table:

**ATTITUDE OF FARMERS TOWARD EXTENSION WORK IN AREAS VISITED**

SECTION	Total number	Number favorable %	Number unfavorable %	Number noncommittal %
Eastern	387	65	9	25
Central	994	45	10	45
Western	920	70	9	22
Total	2301	58	10	32

While in the above table the percentages are based on the total number of farmers interviewed, if we considered only those farmers who knew the respective agents and, therefore, were in a position to judge of the work, we find that in the Eastern States 97 percent were in favor of the work, 72 percent in the Central States, and 95 percent in the Western States, or, on the average, that practically 90 percent of the people who knew of the extension work looked upon it favorably. Attention is called to the apparently large percentage of people in the Central States who were non-committal. This is probably due to the fact that the county agent work has developed much less rapidly in the Central States than in the Eastern and the Western States. It will be recalled that at the time America entered into war with Germany relatively more counties were without county agents in the Central States than in other sections.

In the following table an attempt has been made to tabulate the number of farmers attending extension schools, farmers' institutes, etc. in the different sections of the country, or who were visited by extension specialists and to indicate the help they received.

**FARMERS ATTENDING EXTENSION SCHOOLS, FARMERS' INSTITUTES,  
OR VISITED BY SPECIALISTS, AND HELP RECEIVED**

SECTION	Total number of farmers visited	Extension Schools		Farmers' Institutes		Specialists	
		Attended meetings. Number	Percent- age helped	Attended meetings. Number	Percent- age helped	Visited by Number	Percent- age helped
Eastern	387	19	79	100	69	43	77
Central	994	90	70	602	47	68	68
Western	920	33	91	1	100	53	90
Total	2301	142	76	703	50	164	78

About six percent of the farmers interviewed attended extension schools, about 30 percent attended farmers' institutes and about seven percent had been visited by specialists. In the Eastern and Central States about every other farmer interviewed had attended farmers' institutes, and more than 50 percent of them, on the average, thought the institute a helpful extension agency. It will be noted also that practically 76 percent of those attending extension schools and 78 percent of those who were visited personally by extension specialists received some direct help from this work.

In the following table the number of farms in the various communities which were carrying on demonstrations in the different lines of work is tabulated with reference to agriculture, the home, and boys' and girls' club work.

FARMS IN COMMUNITY CARRYING ON DEMONSTRATIONS

SECTION	Number of records taken	Agriculture	Home	Boys' and Girls' Clubs
		Number of farms carrying on demonstrations	Number of homes carrying on demonstrations	Number of farmers who knew of demonstrations
Eastern	387	145	22	2
Central	994	280	9	28
Western	920	726	190	102
Total	2301	1151	221	132

The table brings out the interesting fact that of the 2,301 farmers interviewed, 1,151, or practically 50 percent of them that knew of some farm on which demonstration work was being carried on; 221, or nine percent, knew of some demonstration work for the improvement of the home; while only 132 farmers, or six percent, knew of demonstrations which were being carried on in boys' and girls' club work. The relatively small number of people who knew of demonstrations in club work has raised the question as to whether or not the club work has been adequately stressed in the rural communities, whether as a matter of fact as thus far conducted it has not been more of a small town and urban than a rural enterprise. The total number of records taken in this survey are too few to enable one to arrive at any final conclusions with reference to this matter, but extension directors may think it worth while to look a little more closely into this work in their respective states to see whether we are adequately stressing club work as an extension enterprise for the open country and for rural boys and girls, whether it is not to a larger extent than is justified a town and urban affair.

Another phase of the survey is shown in the following chart dealing with the literature of farmers and membership in clubs other than the farm bureau.

LITERATURE OF FARMERS AND CLUB MEMBERSHIP

SECTION	Number of records	Bulletins received			Papers and magazines			Clubs Number
		Federal	State	Daily	Weekly	Agricul- tural	Maga- zines	
Eastern	387	176	214	231	61	320	146	183
Central	994	440	561	766	463	666	324	328
Western	920	213	415	824	244	753	590	142
Total	2301	829	1190	1821	768	1739	1060	653

In looking over the above table it will be noted that about one in every three farmers interviewed received federal bulletins; one out of every two and one-half received bulletins and reports from the colleges. Information not included in the table also indicates that one farmer out of every three receiving the above publications claimed to be benefited by reading them. An interesting feature of the above table is that relating to papers and magazines. It will be noted that practically four out of every five farmers took both a daily paper and an agricultural paper, while on the average only one farmer out of every three took a weekly paper. This latter fact may account, in some degree, for the popularity of the "house organ" published by many of our farm bureaus under the title of "Farm Bureau Monthly" or "Farm Bureau News." Only about one family in every two of those interviewed appeared to be taking a magazine, and the survey agents reported that these magazines were usually some kind of a woman's magazine. Under "Clubs" it will be noted that only one farmer out of every four interviewed belonged to a farm organization other than the farm bureau. Statistics gathered, but which are not presented in the above table, indicated that 804 of the farmers interviewed were members of the farm bureau. The figures in the above table accord in the main with a similar survey made in 1912 wherein an average of 65 percent of the farmers interviewed were found to subscribe for an agricultural paper.

When asked the question as to which of all the various agricultural extension agencies, such as the county extension agents, agricultural press, farmers' institutes, farmers' class organizations, bulletins, etc., had been of greatest service to them, the farmers replied as shown below.

FARMERS' ESTIMATE OF VALUE OF DIFFERENT EXTENSION AGENCIES  
AFFECTING THE FARM

SECTION	Number of records	County agents and farm bureaus %	Agri- cul- tural press %	Farmers' insti- tutes %	Farmers' class organi- zations %	Bulle- tins and reports %	No opinion %
Eastern	387	37	21	2	9	6	22
Central	994	7	56	1	2	2	30
Western	920	72	8	.	2	1	15
Total	2301	38	31	1	3	3	22

It will be noted from the above table that 38 percent of all the people interviewed, on the average, placed the county agent and farm bureau first as the agency which was rendering them greatest service; 31 percent placed the agricultural press first; while 22 percent, on the average, had no definite opinions. In looking over the table it is interesting to compare the replies received in the Eastern, Central, and Western States, as regards the value of the county agent and farm bureau. In the Eastern States, for example, 37 percent put the county agent and farm bureaus first and 31 percent the agricultural press. On the other hand, in the Central States, where the farm bureaus have been organized for a shorter period, but seven percent placed the county agent and farm bureau first and 50 percent the agricultural press. In the West, again, the farmers appear to appreciate the county agent and farm bureau and the larger percentage of them placed this agency first, a relatively small number placing the agricultural press first. The percentage of farmers in the Central States who were noncom-

mittal would seem to indicate that to a considerable degree farmers in that section are withholding judgment until they can get better acquainted with county agent work.

Other data, not shown in the above table, indicate that out of 2,301 people interviewed, 1,587 were noncommittal as regards home demonstration work, a reflection again of the newness of this work and the fact that the people are waiting for it to prove its worth before lending their approval.

A feature of the work of the Federal Department of Agriculture and the State Colleges in many of the States has been the development of the farm bureau—a plan whereby the extension agents of the Government, supported in large measure by public funds, sit down in counsel with the people of the community which they serve and together work out a plan for agricultural improvement which the farmers and their wives believe is significant for their county and community. A comparison was therefore worked out touching the attitude of farmers towards extension work in States with farm bureaus as compared with States without farm bureaus. Three States were selected in which farm bureau work was fairly well organized and in which 526 farmers had been interviewed, and the attitude of these farmers compared with that of those in three States which had not developed farm bureaus and in which 492 farmers were interviewed. The results are shown in the table below:

ATTITUDE OF FARMERS TOWARD EXTENSION WORK IN STATES WITH FARM BUREAUS  
VS. STATES WITHOUT FARM BUREAUS

STATES	Total number of records	First place		
		County agent	Agricultural papers	No opinion
Three having farm bureaus	526	66	13	11
Three without farm bureaus	492	28	39	25

It will be noted that in the three States with farm bureaus 63 percent of the farmers place the county agent first in importance and 13 percent the agricultural press, whereas in the three States without farm bureaus only 26 percent place the county agent first, while 39 percent deem the agricultural press to be more important.

The above table is based on too few records to enable one to draw final conclusions but in so far as the records have value, they seem to point to a greater appreciation of the county agent work in those counties which have a well organized farm bureau than in those counties which do not have such farm bureaus. It will be noted also that the number of farmers who look upon the agricultural press as being an agency of greater helpfulness to the farmer than the county agent is smaller in the States having farm bureaus than in the States without farm bureaus.

One of the questions asked each farmer interviewed related to the farmers' view as to the biggest agricultural problems in his community. The results may be summarized as follows:

## FARMERS' ESTIMATE OF BIGGEST AGRICULTURAL PROBLEMS IN HIS COMMUNITY

Total number of farmers interviewed .....	2,301
Labor placed first by .....	682
Marketing placed first by .....	309
Better organization placed first by .....	55
Financial facilities placed first by .....	21
Improved farm practices placed first by .....	
Pest control .....	132
Soil improvement .....	218
Drainage and irrigation .....	137
Weed control .....	43
New crops .....	30
Livestock disease control .....	30
Livestock improvement .....	47
Schools placed first by .....	637
Roads placed first by .....	1
Daylight saving placed first by .....	14
	9

It will be noted that labor is placed first by the majority of the farmers who replied to this question, some phase of improvement of agricultural practice second, while marketing problems are placed third. Practically only one in seven farmers mentioned the need of more adequate marketing facilities as of first importance in his community.

## SUMMARY

Briefly summarizing, it may be stated that the survey would seem to indicate that extension work in agriculture is pretty well known among the farmers and quite generally approved. The county agent work has apparently established itself in their confidence and has practically become a permanent feature of extension work and accepted throughout the northern and western territory.

Home demonstration work, in the North and West, seems to be still little known and apparently has yet to prove itself. Over two-thirds of the people interviewed were noncommittal in regard to its value.

Boys' and girls' club work does not appear from this survey to be as well known as it was believed it would be, and the question has been raised as to whether or not this is due to greater attention having been given to the organization of this work in smaller towns and urban communities than in rural districts. It seems desirable to make further study of this matter.

The county agent, with a good farm bureau behind him, seems to be doing more effective work and stands higher in the regard of the farmer than the county agent without such a farm bureau.

The agricultural press continues to be one of the cheapest and most efficient agencies in promoting agriculture and the results of the survey in this respect correspond practically to the results secured in 1912.

The three outstanding problems before the farmers, as viewed by the farmers themselves, and placed in the order of their importance, seem to be: first, labor; second, methods of improving agriculture; third, marketing. The survey seems to point out the desirability of those engaged in extension work making a study from time to time of the efficiency of their work the field, in order that they may clearly apprehend the relative value of each of the different lines they are pursuing and better understand the attitude of the farmers themselves toward such work.

THE CHAIRMAN. Mr. Bradford Knapp, Chief of Office of Extension



Work in the South will now continue the discussion on "The General Scheme for Carrying on Extension Work with Women."

# THE GENERAL SCHEME FOR CARRYING ON EXTENSION WORK WITH WOMEN

BY BRADFORD KNAPP

The Act under which the Colleges of Agriculture and the Federal Department of Agriculture have been established and are endeavoring to develop extension work contains very brief and general language referring to the objects of the work. The phraseology to which I call your attention is as follows:

Section I. "That in order to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage the application of the same, there may be inaugurated, in connection with the College or Colleges in each State, etc."

Section II. "That cooperative agricultural extension work shall consist of the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or resident in said colleges in the several communities, and imparting to such persons information on said subjects through field demonstrations, publications and otherwise."

The Act was passed in 1914 and became a law by the signature of the President of the United States on May 8. There were then 215 county home demonstration agents in the Southern States, 15 of whom were in South Carolina and 28 in Georgia, from which States came Congressman A. F. Lever and Senator Hoke Smith whose names are popularly attached to this Act.

Without question, then, the Colleges are charged with the duty of disseminating useful and practical information on subjects relating to both agriculture and home economics. The work as developed and as understood at the time of the passage of the Act is broad enough to cover the purveyal of useful and practical information for the men and the women, the boys and the girls upon the farm.

I need not repeat here what I have mentioned at other meetings of this Association, namely, the distinction between extension work and vocational education. From the standpoint of extension work let us remember that we are seeking for the problems of rural life and seeking to bring to their immediate solution such experience and knowledge found anywhere or in any institution as may be deemed useful in helping to solve the particular problem in question. We are anxious to sit in council with the people involved, to ascertain what their problems are, and to secure their cooperation in working them out.

It is necessary to know what we are seeking to do before we can very well shape up a program for doing it. In a broad way the problem of rural life may be divided into the problems of the individual farm and the problems of the community, or the farm in its relation with others. Likewise they may be divided into the problems of production, problems of distribution and marketing, and social and educational problems. On the individual farm, it seems to me, these problems divide themselves very naturally into two divisions,—the farm problems and the home problems.

Any scheme for carrying on extension work which fails to take in all of these falls short of the ideal.

Our farm management people tell us that the farm is divided into a number of enterprises, and that good farm management consists of the selection of the right enterprises and the proper and businesslike correlation and administration of these enterprises to guarantee the highest, continuous and permanent profit on the entire undertaking. Often in any such analysis the province of the farm woman and her daughters is entirely overlooked. The farm home, to my mind, is very sharply to be distinguished from the city home, especially from the standpoint of its business side and not considering the even more important social, moral and sentimental attachments to it. The city home, as a business establishment, is a place for the economic and businesslike purchase of supplies and the converting of such supplies into food, clothing and shelter for the family. The farm home is this and a great deal more. The tendency of city people is to strip from the home as many of its industries as possible in order to relieve the women and girls of labor in the home and to permit them to seek gainful employment in industries established in the city. On the other hand, because of its isolation and distance, such a plan can not be pursued in the country home. Its enterprises or industries must grow up around the home in order that mother and daughters may be employed in gainful occupation. The amount of good planning and wise business management devoted to it and to the correlation of these enterprises with it, more often than not differentiates the successful farm home from one which is unsuccessful.

In these days when women are seeking business life and a career, will I be challenged for pointing out the enterprises which may furnish the farm woman with an opportunity to exercise her fine talents for industry, management and administration? Take the average Iowa farm, for example. Its enterprises may be set down in two classes. The man's farm operations consist of the growing of the corn, small grains, hay, pasturage, hogs and dairy cattle, beef cattle, and possibly some subsidiary crops often raised for commercial purposes or as feed for the livestock. The woman's home enterprises on such a farm are the poultry, the home garden, the home orchard and vineyard, beekeeping, canning, preserving and otherwise putting away fruits and vegetables for future use or for sale in limited quantities, and the manufacture of butter and cheese for home use and for sale. In these categories I have included only such actual enterprises in existence on farms as are not generally known among the activities of the city or town home. The utilization of the products of the farm, the garden and the orchard, and the preservation of these products for future use and for sale, are not activities of the town home, though the town home may purchase articles to be put up for future use.

The point I desire to bring out quite emphatically is that the average farmer has all he can do to develop and master the problems of field crops, insects, plant and animal diseases and pests, rotations, soil fertility, livestock, and farm management and marketing. The farm home and farm together can be, and often are, made the finest piece of real partnership and cooperation to be found anywhere. The enterprises which I have named as woman's enterprises more often than not succeed because of their intelligent administration by the farm wife rather than because of any

attention on the part of the husband. A straightforward recognition of the fact that the farm woman is a business partner in the entire farm operations and that a very important part of her partnership is the handling of these items of production which I have mentioned, in addition to the more important work of the home itself, has been our point of view in the South. To this fact is due much of our success in the home demonstration work.

I feel confident that in the study of farm management a recognition of these facts will go far toward a better understanding and a more independent position for farm women. Her enterprises are as capable of being conducted in a businesslike way and adapt themselves as well to modern laborsaving devices and machinery as do those of the field and barn. Indeed, I may say of these important enterprises in and around the home exactly as has been said of the farmer—they consist of about one-eighth of science or knowledge, about three-eighths art or knowing how, and four-eighths business ability. With this conception of the breadth of the work which can be conducted for farm women and girls, I approach the problem of saying what should be the general scheme for carrying on extension work with women.

In our development of the home demonstration work in the South we purposely use the words "home demonstration" for a number of reasons, but principally because the work to be done is broader than the ordinary acceptance of the words "home economics." In fact, our work for women and girls in the South includes both agriculture and home economics, the problem of home building, home beautification, food, clothing, shelter, etc., and the enterprises of an agricultural character which naturally fall within the province and the fine management of the farm women.

How are we going to establish a general scheme for bringing to farm women useful and practical information to assist them in solving their home problems, their production and agricultural problems, and their community problems? In my judgment the best plan is to do for them in this field which I have endeavored to outline, exactly what we have done for the general farm work, namely—place within the county a person well trained in these subjects, who has ability as a leader and special training for the lines of work to be pursued, give her charge of all the extension work with women and girls in the county and get her to take up the existing problems with individual women and with groups of women and seek their solution through application of knowledge gained elsewhere, through organized as well as individual effort.

I have especially stressed the fact that this woman should have charge of the work for both women and girls. In our work in the South we are confident that a large part of its strength and success arises from the fact that the home demonstration agent stands in exactly the same relation as the county agent. The county agent has full charge of all extension work for and with the men and boys of the county, while the home demonstration agent has full charge of all the extension work with and for the women and girls of the county. If there should be assistants, either men or women, or if there should be a club leader in between, the responsibility for the plan of the extension work and the subject-matter taught passes through these two definite channels. This strengthens the work for the following reasons:

(a) The work with the girls naturally paves the way for the work with their mothers.

(b) Mothers and daughters naturally work together. It is not necessary to erect a special mother-daughter club if the mothers and daughters are both handled by the same organization and through the same administration in the extension work. They will work together anyhow. The reaction of the one upon the other is a source of great strength. It is the natural order of things.

(c) Members of the girls' clubs soon graduate and become young and enthusiastic members in the women's clubs, just as the boys from the boys' agricultural clubs become the enthusiastic young demonstrators and leaders in the men's work under the county agent. This plan gives a continuous touch and influence all the way from vigorous youth up to the years of maturity, and therefore strengthens the work of both agents.

We have not bothered our heads very much as yet about the singleness of administration within the county. The home demonstration agent is the equal and coworker of the county agent; neither is put administratively under the other in the county. Whether or not this would always prove satisfactory, I am not here to say. What we have tried to do in the South is to capitalize the importance of the work for women and girls and make it stand out where it should.

Of course, the work of the county home demonstration agent should be backed up by specialists located at the college, representing the subject-matter division in agricultural production and in the entire field of home economics. These should be relatively few, but should be highly trained men and women of fine personality and breadth of mind. Let me suggest here that, as a rule, a woman can do better work than can a man, be he ever so wise, in giving instruction to women, not only on home economics subjects but often on subjects which I have called agricultural, provided she is properly trained for her work. I am assuming that all the specialists employed in the subject-matter divisions at the college will be used in assisting the county home demonstration agents in their work just as they are used in helping the county agents, and that the entire extension service will be operated as one administrative whole.

The order in which existing problems are taken up in a county often measures the success of the home demonstration work. As a rule, in the Southern States we have found it far better to take up the economic problems of production, and especially those which relate to the family income, before approaching the problems of home beautification, dietetics, health, etc. Whether this should always be the order, I do not undertake to say.

Even more than in the case of the county agricultural agent, the county home demonstration agent is inclined to teach by classroom method and make a demonstration, as she calls it, with her own hands, leaving the people to carry out the instructions and fit them to their home conditions as best they may. Home demonstration means a demonstration carried on by the housewife herself for the benefit of her home and for its influence upon the neighbors. The best index of success in the demonstration work is the number of homes in the community adopting the practices and making them a daily habit, and not the number of persons who attend lectures or

manifest a passing interest in what is going on. Skill in getting others to do is more to be desired than the mere personal skill of the agent.

The home demonstration work has had a very profound effect upon the agriculture and the rural life of the Southern States. Every item of the plan of work has fitted the great fundamental agricultural program so necessary to Southern agriculture. In 1910 home canning was almost unknown; today it is almost universally practiced by every one, rich and poor, high and low, white and black. Home gardens in many rural sections, especially in the cotton territory of the South, though not unknown were very few in number. The girls' club work and the home demonstration work in the South made home gardens common and a very wonderful contribution to its economic welfare. I say it without fear of contradiction that the home demonstration work has had more to do with the widening of the ordinary daily diet of the Southern people, with the introduction of the common use of fresh vegetables and fruits, and with increasing the healthfulness and variety of the food consumed in the ordinary rural home in the South, than any other force in existence. With 84.9 percent of all the women in America working habitually in the fields (as shown by the Census of 1910) located in the Cotton States, our problem has been to restore time-honored industries, to add to family incomes, to emphasize production and income, and from these to lead out into the better home and all its attractive features. The mongrel chicken is fast disappearing, along with the razor-back hog, and the eggs are coming to market to raise "southern" standards. Milk, butter and cheese for home use and for sale are the sure promises of a better nourished people through the patient efforts of the county home demonstration agents and the county agricultural agents.

Let me submit a few facts about the work in the South for the purpose of attempting to show how well the work has stood the test during the war period and how well it has come out of it. The surest test is its standing in public esteem because it draws its support from public funds. In 1914, as I have said before, there were 215 county home demonstration agents in the Southern States and none in the Northern States. In the spring of 1917, when war was declared, there were 472 county home demonstration agents in the Southern States and 20 in the Northern States. With the advent of the emergency funds the work was speeded up. On October 1, 1918, there was a total of 1,302 county home demonstration agents in the United States, 841 of whom were in the Southern States and 461 in the Northern States. The year 1919 saw a great reduction in the emergency funds and we are now in the period of readjustment. On October 1, 1919, the number of county home demonstration agents in the United States had dropped to 921, a reduction of nearly 30 percent. In the Southern States there were 707 and in the Northern States 214, a reduction of approximately 15 percent in the Southern States and 55 percent in the Northern States. Naturally, the years of experience and the longer time the Southern States have been at the job had a considerable bearing on these figures.

Of the total funds expended in extension work in the Northern and Western States during the fiscal year 1919, a little over 18 percent were used in the home demonstration work. For the fiscal year 1920 this is apparently to be reduced to a little less than 13 percent. In the Southern States for the fiscal year 1919 a little over 28 percent of the total funds were expended in the home demonstration work, while in the present fiscal year

26.5 percent will be used. In Florida there is almost as much money used in home demonstration work as there is in the county agent work, and in South Carolina the amount of money used in the prosecution of home demonstration project exceeds the sum employed in maintaining county agents work. In some of the larger States of the North and West the percentages used in behalf of woman's work are as low as three percent. In Montana and Vermont, however, the percentages are as high as in some Southern States. This is a mere statement of facts and not an attempt to explain.

In conclusion, let me say that the general scheme for carrying on extension work with women should include all such work for both women and girls within one administrative channel. The work for women and girls should be broader than the field of home economics. It should include the enterprises or industries in, about and near the home itself naturally falling under the guiding management of the housewife. The emphasis, in the introduction of the work, may more often than not be placed first on income and upon economic problems, which method of approach leads naturally into the home life problems themselves. Home demonstration agents should be trained not only in home economics but have a reasonably sound education and some experience in certain types of agricultural production; they should be backed up by specialists from the college, properly administered and correlated with the other extension activities. In short, the best methods of disseminating useful and practical information to persons not resident at the college should be employed.

The views I have expressed are born of my experiences of guiding this work for nearly nine years during its pioneer days. If these experiences are of any value to those who are thinking deeply of American rural life, and the result is greater and better service for farm women and girls, I shall be satisfied.

THE CHAIRMAN. Prof. Isabel Bevier of the University of Illinois will continue the discussion of this subject.

#### THE ILLINOIS SCHEME FOR EXTENSION WORK WITH WOMEN

BY MISS ISABEL BEVIER

Doctor Knapp and Miss Ward seem to have told the story so completely that I feel there is little occasion for me to speak. Miss Ward has given us the conditions under which women live and work. She has told us how little money they have, how they carry the wood and water, how they milk and under what lack of conveniences this is done. Illinois has samples of all kinds of work and of all kinds of men and women. Some of our homes are well equipped and some of them are poorly equipped, and after all we must remember that the work is to be done by the men and women we have now. We have no time to make others.

Doctor Knapp has evidently established a partnership relation with the southern women in this county agent work that does not obtain in the North and West. I hope he will keep right on talking about this division of money and this partnership in business. I hope he may give that address in many places in the North. After he gets the sentiments of that paper across there will be less talk of women's inability to sign a check. That

comes, you know, from lack of practice. They could acquire the habit easily if opportunity offered.

It seems advisable that I should call attention to the points of difference in the work in Illinois as compared with the South. We realize that these divergencies in practice may not be extreme, but it seems to us that there are a few points in which we attack the problem somewhat differently.

First, in regard to organization. The men and women in Illinois have separate organizations. The women are incorporated under the state laws, the treasurer is bonded. We feel that the advantages of this method are that women are put upon their own responsibility to do business and must, therefore, learn business methods, so that they do get considerable practice just in maintaining their organization. Women are rather loth to undertake business and yet it is very essential that they should, and this method gives them practice. It is something of an undertaking to get incorporated. The women who go through it know quite a little more than they did before about business and on the principle that "every little helps" we think this plan has many advantages.

Second, we feel that much of the work done by and for women in extension work in Illinois has been in the nature of an entertainment, therefore has lacked sequence and educational value. There has been quite too much of "filling the program," taking the place of the "bird man" who has failed to appear. It seems to us that if after 15 years the women of Illinois have not learned to make salads they had better return to the privacy of their own kitchens and there finish the job. We are quite assured the demonstrations are not complete until they are conducted in the home, and we are stressing that part of it this year and avoiding the demonstration as such in the public meeting.

This is just another way of saying that the conception of the work has been too narrow. Home improvement is a very large subject, not to be measured in terms of recipes or meetings attended; a special effort is being made this year to have the housewife work at the problem as a whole. And we are helping her to that vision by organizing the work in our own office under general heads, namely: organization, food, health, household equipment, clothing and school lunch. We had time in the summer really to study our problem together and this plan is the result of that study. Then we called in our county home demonstration agents and conferred with them regarding the plan. The agent is supposed to show in her own office the benefits of orderly organization of work. The fact that almost every agent brought with her some one of her board members helps her in getting this vision of the work as a whole into her county. The home demonstration agent and her board decide the ways and times in which these different parts shall be studied and when they are studied the relation of the part to the whole is carefully considered. For example, in the food work we are not giving a recipe, neither are we giving demonstrations as such. We are talking about food, first, using Doctor Langworthy's chart of the great classes and functions. Then we may have a lesson on milk, on vegetables, on meats, but in every case the class, the use, the cost and the relationship are shown.

So much for the machinery of the task. There remains yet the third point, namely, the purpose of it all, and that is perhaps summed up best

in the words, the glorification of the daily task, the growth of the individual and the general betterment of life.

All of us realize how restless and unsettled conditions are throughout the world. The housewife has not escaped this general atmosphere. She has had a good deal to do in the past two years with "drives" and crowds, Red Cross groups, conservation groups, and child welfare groups. She has had many calls to take her outside the home. Now the banners have ceased to wave, the "drives" have been given up, the Red Cross rooms are deserted; and yet there are the three meals to be prepared, there is the housekeeping to be done. There is not the stimulus of competition. Nobody is going to check her product. It is to be eaten perhaps without a word of appreciation, to be taken as a matter of course. A very large question is, shall she be able to keep this spirit of service, this inventive ingenuity? What is to be done with the time that she has been giving to knitting? Some county agents have put this question directly to their women. All of us have that question to answer and upon the way we answer it depends very much the atmosphere of our home, the benefit to us and our community.

Two suggestions are at hand. Part of it probably should be given to rest. A good many women's nerves have been badly worn and the first need is to get them in better condition. The second is, to substitute reading and thinking for knitting. With the problems that are pressing now for solution—and they will be determined in some degree at least by votes—it is necessary that women should learn to use this right of suffrage wisely, and that can not be done without study and thought.

The community idea of service is growing and needs to be encouraged. Women can really gain a good deal of knowledge about the way in which their use of suffrage can be made effective or defeated by studying the politics of their local community. Many women are totally ignorant of what agencies are used to get, for example, a safe water supply, clean milk and sanitary markets in their own neighborhoods. The question of civic improvement has many angles. It is for the women to decide, not to attempt everything at once, but along which line their efforts can be made most effective. The old motto, "Here a little, there a little," is to be made, "Here a little and then more in the same spot."

On motion, the Section took a recess until Thursday, November 13, at 2 P. M.

#### AFTERNOON SESSION, THURSDAY, NOVEMBER 13, 1919

The Section was called to order by the Chairman, Director C. S. Wheeler of Ohio State University.

Considerable time was devoted to the discussion of the future status and work of the Section in view of the reorganization of the Association (see pages 66-79). It was finally decided that a committee on nominations should report as usual, and that this report after adoption by the Section, should be referred for action by the Association at the final session.

Thereupon the committee on nominations made its report, which was adopted and referred to the general session.\*

\*The nominations as chairman and secretary were offered by the nominating committee for the new Section on Agriculture, as nominations for the Subsection on Extension Work and approved by the general session (see page 147).



**THE CHAIRMAN.** This session was intended to be a joint session of the newly formed American Federation of Farm Bureaus and of this Section of the Association of American Agricultural Colleges and Experiment Stations. As a matter of fact the business of the former Association has prevented it as a body from attending this session. A few of its members are with us, however, and are very welcome. It well may be that some of the phraseology of the papers to be presented is predicated on the supposition that they were to be presented at a joint meeting.

The discussion of the general subject of "The Relation of the County Agent to the Farm Bureau and of the College to the State Federation" will be opened by Vice-Director M. C. Burritt of the New York State College of Agriculture at Cornell University.

**WHAT SHOULD BE THE RELATION OF THE COUNTY AGENT TO THE FARM BUREAU AND OF THE COLLEGE TO A STATE FARM BUREAU FEDERATION?**

**By M. C. BURRITT**

I am impressed with the importance of this occasion and with the possible events which may grow out of it. We are making agricultural history.

The delegates of a quarter of a million American farmers—farm bureau members—representing the most progressive element in our farmer citizenship are met in conference here with the public officers, state and federal, who are charged with the administration of those laws and agencies for agricultural education which have contributed so much to American agriculture. Both groups, I take it, seek the same end—the conservation, the orderly development and the improvement of the nation's greatest single interest, agriculture. Truly science and practice are getting together on a really working basis. Science, which is accurate and systematic knowledge and practice or experience in the application of knowledge, should make a strong partnership for cooperation.

**GETTING TOGETHER**

I presume that this is the primary reason for this joint meeting—to arrive at mutual understanding and to clarify the basis for future relationships and cooperation. This presupposes a clear differentiation of the two great groups which are to have cooperative relationships. Each must be strong and able to function independently. This means that beginning with the smallest units each must have a real and important part to play in determining programs and policies, in providing and administering funds, and in employing and directing agents.

The county farm bureau is, or should be, a partnership between the local county association of farmers and the public agricultural institutions, for the developing and carrying out of a county program of work, providing funds and employing and supervising agents and other means to do the work. The state farm bureau federation extends, or should extend, this partnership to the whole State. It so relates the various local county associations that they are unified and strengthened and therefore placed in a position to cooperate on a more nearly equal basis with their College of

Agriculture and the United States Department of Agriculture, which the college represents.

#### A LOGICAL STEP

The organization of a National Federation of State Federations of County Farm Bureau Associations is the next logical step. This is merely the extension of the partnership idea which originated in the counties and which has been successfully applied in the majority of the States in the North and West. Why should farmers not enter into a real and effective partnership with the General Government? No occupation is more important to the whole people. It must be preserved and it can be preserved only by maintaining its economic welfare and a standard of rural living that will attract and hold the necessary number of persons in it. There are two great interests in agriculture: first, that of the farmers themselves, which is for a livelihood, and the means of good citizenship; and second, that of all the people which is for an adequate and necessary food supply, and a prosperous farm population. Both these interests must be safeguarded. A partnership between these two interests—farmers and the official representatives of the public in agricultural affairs—is therefore logical and full of promise. It is, in my judgment, also sound and wise in principle, and I am very hopeful that we may be equally sound and wise in interpreting the principle into practical action.

#### A STRONG FARMERS' ORGANIZATION NEEDED

There is needed a strong and independent organization of farmers, standing on its own feet, with its own resources, which would be competent to enter into such a partnership on an approximately equal basis. The prospects for a really national farmers' organization were never better. The proposed National Farm Bureau Federation promises to have this necessary element of strength and to become national because it will be a federation made up of state federations which in turn are made up of county federations, which are the combination of the community units, and these in turn are made up of the individual farmers which compose them; and the whole structure will have grown up logically from the bottom—practically every community in every county in every state will be or may be represented. Moreover, this federation may have connections with the public agricultural institutions, which will guarantee an expertness of action, a soundness of policy based on facts, and a universal contact with the States and localities, and this gives promise that the proposed new organization would proceed on a basis that ought to produce success.

Of course, such an organization would have other possibilities as well—possibilities of failure or of actual harm to the industry. While this is somewhat improbable, everything depends on the soundness of the program and the character of the leadership.

#### A SURVEY OF THE FACTS

The task assigned to me in common with others on this program is to examine the facts and determine how the relationships that already exist are working out and what future relationships should be. Although the state farm bureau federation president who follows me will undoubtedly

present the farmers' situation, needs and point of view and although I am here because I am a representative of a state extension service, I shall speak in part for the farmer partner because, it seems to me, that he has not sufficiently asserted himself nor has his point of view been enough appreciated in the past.

Recognizing that my own personal opinion and judgment would be of limited value, and believing that I could be of most service to this group by bringing together the facts as to relationships between the county agent and the farm bureau on the one hand, and between the state colleges and the state federations on the other, as they actually exist in the several States, and by collecting the opinions and judgments of those who are the leaders of the farm bureau movement in the States, I sent out some six weeks ago two questionnaires, one to extension directors and one to state leaders. These questionnaires contained some 90 questions each, which inquired as to the definition of farm bureaus and state federations in the various States, the extent of the movement, its financial support and management, its purposes and work, and its advantages and disadvantages. The questionnaire on the relation of the county agent to the farm bureau was sent to 33 county agent leaders in the North and West and, with slight modification to fit southern conditions, to 15 leaders in the South. Twenty county agent leaders in the North and West and two in the South replied. Of the extension directors in the 33 Northern and Western States, 28 replied and of the 15 southern directors 8 replied. In two Northern and Western States there are no farm bureaus and in 11 states there are no state federations. Only two Southern States have farm bureaus, and about half of them have county councils of agriculture. Less than half have state federations.

I now give you, in as brief form as possible, the essential facts that have been brought out by these questionnaires, reserving my own comments for the summary.

## PART I—THE RELATION OF THE COUNTY AGENT TO THE FARM BUREAU

### DEFINITION

Since a common understanding of a farm bureau or at least a common point of departure appeared to be essential as a starting point in the discussion, the definition of a farm bureau given in Circular 13, Office of Extension Service, North and West, issued in January, 1919, was used as a standard. Of 24 state leaders in the North and West replying, 21 accepted the definition as describing substantially a farm bureau as organized and conducted under the laws of their respective states. This definition is as follows:

"A county farm bureau is an association of people interested in rural affairs, which has for its object the development in a county of the most profitable and permanent system of agriculture, the establishment of community ideals, and the furtherance of the well-being, prosperity and happiness of the rural people, through cooperation with local, state and national agencies in the development and execution of a program of extension work in agriculture and home economics."

This definition characterizes a farm bureau in three essential ways: (1) as a local association of people, (2) as offering a broad program for

the improvement of agriculture and (3) as a means of cooperation with state and national public agencies in the execution of such a program. We may conclude from the replies that this conception of a farm bureau in the 33 Northern and Eastern States is practically universal. The exceptions do not affect the general definition, but rather the degree of its application. Some States, for example, place greater emphasis on the local associations than do most other States.

The farm bureau idea as embodied in this definition seems to be accepted in the majority of the Southern States in a general way. Conditions and present organization are so different, however, that its application takes quite different forms, as indicated by the answers to other questions.

In the 33 Northern and Western States, 1,121 counties, or 70 percent of all their agricultural counties, are employing county agents on a permanent basis. Of the counties reported as employing agents, 82 percent have "associations of people" as previously defined, supporting the work. The membership in such associations in all Northern and Western States as last reported by the United States Department of Agriculture totaled 455,975, an average of 463 for each of 984 counties.

The latest federal report shows also 970 regular county agricultural agents employed in the 15 Southern States. Only one of these States has farm bureaus, but 560 of the counties have county councils or federations of independent clubs assisting the agents.

Summarizing for the entire country, therefore, it would appear that 2,091 counties or about 76 percent of the entire number are employing county agents, and 1,481 of these, or about 71 percent, support their agents by membership associations, but less than one-half of these are reported to be functioning well.

#### COOPERATIVE MANAGEMENT

In order to determine how these local associations are managed and what their powers and responsibilities are, a series of questions was asked. From the answers, it appears that in practically every state the local association elects a board of directors or an executive committee to whom is delegated its functions, powers and responsibilities.

In many States—Iowa, New York and others—the local board has full control of all local funds, including appropriations of county commissioners or boards of supervisors. In several States this power is limited to the funds derived from membership, and county appropriations pass through the college, as in Ohio and Indiana, the county board advising only as to expenditures. In many states the local board has so little control even over local funds as to make its powers and responsibilities nominal in character and confined to "incidentals" and advice. Apparently about the same conditions exist in the South, with a considerably larger degree of state centralization and less actual local control and management because of a less amount of local funds and less local initiative.

In most of the States the counties properly have an important part both in the determination of policies and in the making of programs, but the degree of responsibility varies somewhat with the amount of funds contributed.

Of 24 Northern and Western States reporting, 16 indicate that the local board actually selects the county agent on college nomination and

concurrence, while in seven States it does not, and the agent is practically employed by the college alone. In 10 States the local board pays no part of the county agent's salary; in 14 States it pays part of his salary.

In the same way the States are divided as to whether the local board has local supervision of the work of the agents. In the majority of cases it exercises such supervision coordinately with the state leader. In at least four States, the college retains definite and full supervision. In the remainder of the States the situation is either indefinite or not clearly stated.

In all of these points the Southern States quite consistently retain supervision of the agents at the college, fixing and paying the greater part of the salaries and often the expenses also, using local county organizations where they exist in a purely advisory capacity in making up programs.

Perhaps one-half of the States reporting indicate that the local boards make written agreements with the college concerning finances, program and employment of county agent, and many of those who do not now have such agreements are planning to make them. In most cases this is provided for by state law.

In only nine out of 19 Northern and Western States is the county agent considered as the manager or director of the farm bureau by the county association and by the county agent leader.

The county agent assumes responsibility in seven States out of 19, or 37 percent of those replying in the North and West, for the supervision of home economics or home bureau work and in nine States, or 47 percent, for the supervision of boys and girls, or junior extension work, when these exist in his county. The other states qualified their replies in both cases as "where there is yet no regular agent," "to a limited extent," and "only as necessary to secure harmony in work."

County agent leaders in 16 States frankly admit that in practice the county agent largely shapes and directs local policies. Most of the leaders, however, qualify this statement by such phrases as "very largely," "indirectly," "in general," "in cooperation with the local board," "to some extent." Almost universally the county agent admittedly has a "strong influence" "especially where the organization is new and young." This influence is likely to grow less as the organization grows in strength and power and the county agent becomes a real agent of his employers.

Sixteen States reporting in the North and West recognize the county association as an independent organization over which the extension service has no control, except in so far as their acts must be "cooperative" under the laws, and as is "mutually agreed upon" in connection with the county agent's work. Recognition of these independent associations as partners with the public institutions in the conduct of "cooperative extension work in agriculture and home economics" is made in 20 out of 22 States replying.

In the South the county association or council is apparently almost exclusively an advisory organization with few if any administrative functions. It is "usually consulted in making up programs and budgets," but seems to have little real power to administer funds or initiate a program.

#### FINANCES

The average total cost of a county farm bureau in 21 States in the

North and West is reported as \$4,031. The income, which is somewhat greater than this, is derived as follows:

	Total	Percent
U. S. Government funds (Including States Relations Service and Federal Lever).....	\$938	18.8
State Lever and state free funds.....	893	18.0
Appropriations of county boards of commissioners or supervisors .....	1945	39.0
Membership fees in county associations.....	665	13.3
Other local sources and miscellaneous.....	544	10.9

Assuming that the amount noted under the head "miscellaneous" is locally secured, it appears that on an average the counties in the Northern and Western States are paying 63.2 percent of the cost of the work, of which nearly two-thirds is derived from county tax money and about one-fifth from membership fees. In general the cost of the bureaus is highest in the East and lowest in the West. Counties in the Eastern States derive their largest support from county appropriations, and counties in the Western States from state and federal aid. In one state only does the item of membership fees alone constitute the largest single source of the income.

Not enough answers from state leaders in the South were received to warrant tabulation, but the average cost per county is probably much lower than in the North and West. No membership fees are available in most southern counties.

Nearly 90 percent of the counties employing county agents in 23 States in the North and West have membership associations with a fee. The \$1 fee is decidedly the most popular, 370 out of 687 counties, or 54 percent, assessing this fee. Six counties have a fee of fifty cents; 22, a fee of \$1.50; 40, a fee of \$2; 74, a fee of \$2.50 or \$3.00; 117, a fee of \$5; and 54 counties in Illinois a fee of \$10.

It is worthy of note that in answer to a question asking whether existing arrangements are satisfactory, practically every state leader thought so and would make no changes, except that many would like more funds to work with. It is a condition of almost complete self-satisfaction—perhaps dangerously so.

#### ADVANTAGES

The advantages of existing relationships between the county agent and the farm bureau most frequently mentioned are:

- (1) The local responsibility, and hence the greater local interest, felt by the farmers when they have a part in the financing and management of the work.
- (2) The relationship develops the power of a local organization and a local leadership and provides a way for their full utilization.
- (3) It brings public institutions into direct contact with farmers and localities, and *vice versa*.
- (4) It emphasizes the educational character of the program because the plan is itself educational.

#### DISADVANTAGES

Too few states see any disadvantages whatever in the plan—another

evidence of possible over-satisfaction, which may limit progress because of lack of alertness and safeguards. Disadvantages mentioned by four states are:

- (1) The danger of becoming involved in political questions and engaging in politics.
- (2) The danger that the local association may undertake enterprises, particularly of a commercial nature, in which neither the public partner nor the joint representative—the county agent—may properly take part.
- (3) The delegation to, or the assumption by, the county agent of too much responsibility and too many duties, especially relatively unimportant details, to the detriment both of local initiative and of the educational program for which the bureau chiefly exists; in other words, making the agent a mere chore boy.

#### SUMMARY—FARM BUREAU RELATIONSHIP

What, then, should be the relation of a county agent to a farm bureau—the local association of farmers?

It seems clear, from the facts gathered, that the public institutions believe in a partnership with local associations of farmers for the conduct of county farm bureau work. The principle is generally accepted as sound. But practice does not always accord with the theory. The partnership is too often nominal, and the farmer partner—the local association—weak and merely a convenient local vehicle for the public partner.

Is real and vital cooperation possible, when the local association does not control its own county funds and has little or no power to determine policies and to adopt or reject a program, except by tolerance or courtesy? True, it can go through the motions in these things, and this may have great semblance of the fact. Does not this condition limit real and earnest cooperation? Can a county agent really represent the farmer partner, when this partner pays none of his salary, has nothing to say about the amount of it and has no supervision over his work? Is it to be wondered at that in some states farmers' organizations oppose the farm bureaus and appropriations in their behalf?

Summarizing, it would seem that ideal cooperative relationships exist in but few of the States. In too many instances the public institutions dominate the partnership either through supplying funds, through provisions of the state law (usually drawn by these institutions), or because of lack of local initiative and local funds. In a few cases the local associations have too large a control for the best interests of the public partner. In a majority of the States no definite, clear-cut partnership policy exists. There is great need for the general adoption of a clear-cut policy in all the States which will fairly provide for the interests of both partners.

It is to be hoped that the proposed national federation will be of great assistance in this respect. Close contact with farmers and their organizations almost invariably increases one's confidence in their ability and respect for their judgment. This is the verdict of those who have given such contact most thorough trial. The collective judgment of the men on the land is usually sound.

Respect and confidence must be mutual and power and authority substantially equal, or at least each must be independently strong in order to insure the best cooperation. If the principle of partnership and mutual

and equal rights and privileges is closely adhered to, as it should be, both policies and program will be jointly arrived at and agreed to on a fifty-fifty basis. To assure this, both parties must provide funds and together administer them, since administration follows funds. The same principle will require the joint employment of the county agent, the sharing of his salary, and the joint supervision of his work.

Having met these standards, the public institutions should then deal with the county organizations in all matters of program, finances and contracts. The county agent is, then, the joint representative of the public and of the farmer partner, and the relationship which he bears to the farm bureau—the local association of people—is that of a skilled employee to his employer, as the hired manager of an enterprise in which the local people are cooperating with the public agricultural institutions for the improvement of agriculture. Only by such means can the best local initiative be secured while at the same time the advantages of the public relationship are retained.

## **PART II—WHAT SHOULD BE THE RELATION OF A COLLEGE OF AGRICULTURE TO A STATE FEDERATION OF FARM BUREAUS?**

### **DEFINITION**

Here again a uniform starting point was considered necessary in order to secure comparable answers. In the North and West five states have no federations, but 21 out of 23 other states replying agreed substantially to the definition given which was as follows:

“A state farm bureau federation is an association of some or all of the county farm bureaus (associations) of the State, usually represented in the federation by a delegate or delegates, formed for the purpose of seeking collectively the solution of important production, marketing and general economic and social agricultural problems which the county bureaus individually are trying to solve.”

Two States did not agree to this definition. Iowa offers the following:

“A state farm bureau federation is an association of several or all of the county farm bureaus of the State which is officered and financed entirely by the farmers for the purpose, first, of collectively seeking a solution of problems of a state-wide or national nature, such as transportation, marketing, legislation, etc., which the individual farm bureau can not because of its size and the source of its funds undertake, and, second, of assisting the county farm bureaus in their various educational projects which are being carried on in cooperation with the State Agricultural College and the United States Department of Agriculture.”

Pennsylvania would limit the activities of a state federation to those of its constituent local bureaus and the activities of the bureaus in turn to those legitimate for a county agent. Illinois agrees, but qualifies its agreement in regard to the make-up of the federation, this being based on individual membership in that State.

In the South the state organization corresponding to the federation in the North and West is quite differently thought of and defined. It is, in most of the Southern States where it exists, a federation of county councils, which are themselves federations of community clubs or other groups, not always sharply defined. Several States, however, agree generally to the definition.



## EXTENT

Of the 28 Northern and Western States answering the questionnaire, 19 have state farm bureau federations and nine have none. Four of these nine are contemplating the organization of a state farm bureau federation, three more may so organize, and one has considered the matter through representative delegates who decided against such a federation.

In the 19 States having federations, 552 counties belong to the federation while 214 counties which are eligible, or 28 percent, do not. The member counties have a total individual membership of 296,513, which is 65 percent of the total farm bureau membership of 455,975 as last reported by the United States Department of Agriculture in the North and West.

Seven Southern States answered the questionnaire, and of these only two reported state federations or councils. Two more contemplated state federations as soon as enough county councils are organized. The state federations reported embrace 70 counties, while 50 eligible counties are not affiliated with their federations. The total number of members represented in the two organized federations or councils is about 43,000.

## FINANCES

Financial support of state federations is, of course, derived from the member county associations. The 21 States replying to this question are about equally divided in the method of levying the fee. In 10 States the fee is based on the county unit itself, while in 11 States the fee is based on the individual membership in the county unit.

The fees per county unit are \$10 and \$20 respectively per county in two States, \$25 in six States and \$50 in one State. Where fees are based on individual membership they are 10 cents per member in two States, 25 cents in two States, 50 cents in two States, \$1 in four States, and \$5 in one State. The phrase is often added "or such part thereof as may be required."

## MANAGEMENT

In nearly all cases the federation is governed by a board made up of one or more delegates or directors from each member county. The favorite number of delegates per county is one with an alternate. A few states base the number of delegates on the number of individual memberships in the member unit, as, for example, one delegate for each 500 or 1,000 members.

In a majority of the States answering, 13, the extension service of the college is represented on the executive board of the federation; in eight States it is not. The representative is almost always the extension director and in several instances the county agent leader also. In all but one of the 13 States answering the question, this *ex-officio* representative has no vote, but acts as a conferee and advisor.

In answer to a question as to the organic relation of the college to the management of such a federation, seven directors replied unqualifiedly "none," six mention "close cooperation," and two others say "advisory" only.

Practically all the directors think that the college should have one representative on the federation board, without vote, to advise and consult with it on all matters of mutual interest.

## PURPOSES AND WORK

Questions were asked both as to the stated purposes of the federation and as to the work actually undertaken thus far. These are of vital importance. The purposes as usually stated in the constitutions are, in order of frequency of mention:

(1) To correlate, strengthen and promote the work of county farm bureaus and to develop their work as a state-wide program. (This answer is most characteristic of the Eastern States.)

(2) To advance, protect and promote the interests of agriculture—"to improve agriculture, economically, educationally, socially." (These more general objects are characteristic of the replies of the Corn Belt States.)

(3) To study and to seek the solution of economic, marketing and production problems.

(4) To secure agricultural legislation. (This is mentioned by only a few States as an important object.)

(5) To cooperate with the extension service in promoting a program of work. (This is given as an object by several States.)

Another object mentioned is "promoting understanding and the responsibility of the farmer to society and of society to the farmer."

## DANGERS

A few directors see no dangers in the development of a state federation of farm bureaus, but most of these directors add a qualifying "if the federation sticks to its original educational purposes and seeks to sponsor and encourage farm bureaus and their work." Many directors, however, see positive dangers, more to the general interests of farmers than to the specific interests of the Colleges of Agriculture. These dangers may be listed in four main groups: (1) politics, (2) radicalism, (3) commercialism, (4) departure from the original educational purpose to further farm bureau work.

The danger of getting into politics is most commonly cited. One director thinks this danger absolutely inevitable. No actual cases are cited, however, and this fear may be only a "bogey." The real political danger is that of becoming partisan, of taking sides with a political party or "class" or in institutional politics. There may be a real need and opportunity to exert political influence of a non-class, non-partisan character, with the object of protecting agriculture as an occupation and insuring the Nation its food supply.

The danger from radicalism is not peculiar to farm bureau federations. It is everywhere present and needs to be watched, especially in leadership. Farmers are not radicals by nature, but they are sometimes led astray by self-appointed leaders in regard to whom they are not sufficiently discriminating.

Many directors think that the greatest danger is that of drifting, or aggressively departing from the main educational purpose for which the farm bureaus were created. This drift, some directors believe, is most likely to be in the direction of actual commercial or political activities. As the organization is perfected, and especially if it accumulates large funds, it will feel its great power; and instead of using this power as originally intended and in the all-but-unoccupied educational field, the federations are

likely to yield to the temptation to do what many other farmers' organizations are entirely able to do, thus duplicating their work and inviting a contest and to enter the fields of buying and selling for farmers in a commercial way and of party or class politics. Many directors feel that this would be a serious dissipation of effort and a fatal mistake in policy.

#### ADVANTAGES

Directors are generally very optimistic about the federation movement, and see many advantages. Chief among these, and in the order of their importance must be cited:

(1) Its truly representative character in county, State and Nation will give to the federation the ability and the opportunity really to speak for rural people and in the national interest as no other organization has done or can do.

(2) The federation will bring the Colleges of Agriculture and the mass of farmers into much closer contact than now exists and will apply the educational self-help principle as never before.

(3) It will develop rural leadership, rural self-expression, and a rural interest in public as well as in agricultural affairs such as has never before been developed and will afford a clearing house for this interest.

(4) It will correlate and unify not only farm bureau but also extension work throughout the States and will help to strengthen both types of work, especially in a financial way.

(5) It will make possible state-wide and nation-wide programs.

Seventeen directors favor state farm bureau federations as they exist in their own states, but one of these does not favor them as they exist in some other states. Only one definitely said he did not believe in federations of farm bureaus; one other is reserving his judgment; and others did not answer the question.

#### FUNCTION

Question 19, "Should a state federation of county farm bureaus (associations) limit its activities essentially to those things which have to do with the advancement of agriculture as contemplated under the Cooperative Extension Act of May 8, 1914, liberally interpreted?" is a most significant one. Twenty-two directors made definite reply to this question, 13 answering yes, and 9, no. Some who thought the federation should so limit its activities did not believe it would.

#### SUMMARY OF FARM BUREAU FEDERATION RELATIONSHIPS

Having reviewed the situation and the official opinions of directors in the majority of the States, we are in a position to arrive at conclusions regarding the movement.

##### 1. *What are its national possibilities?*

Approximately 75 percent of all the agricultural counties in the United States employ county agents, nearly 60 percent of whom are supported by local associations of farmers. In 21 States these county associations are now organized into state federations; in four other States they soon will be. These organizations, their government, their relation to public institutions, their purposes, and their programs of work, are strikingly similar, consider-

ing the wide range and the variable conditions which they embrace. These facts, together with the peculiar relation which the agency bears to the Federal Government, give evidence of the possibility that the movement may become as nearly and truly national as it is possible for any institution to become.

*2. Will it be able to formulate and carry forward a constructive program?*

Conceding then the practicability of a national federation, as well as of state-wide federations, of county farm bureau associations, the first test of such organizations is likely to arise in relation to their ability to formulate and carry out a constructive program representative of the best thought in agriculture. What are the evidences that they will be able to do this?

In the first place, they are made up of unit organizations whose chief merit, in so far as they have been successful, is that they have been built up around definite and constructive county programs for the improvement of agriculture and that they have demonstrated their ability to carry forward such programs. Is it not logical, therefore, to suppose that state and national federations, made up of such units, will also be able to formulate and carry out such a program?

Secondly, the constituent county units employ trained men who because of their education have a keen appreciation of the value of education and are therefore likely to make use of the best that science has to offer.

Lastly, these local units and the trained men whom they employ are in the closest possible touch with the real problems of real farmers and for this reason also are most likely to make a vital and constructive program.

We must, then, answer this question also in the affirmative and admit the probability that such federations will be able to formulate a constructive program for the improvement of agriculture.

*3. What shall be the character of the national organization and of its program?*

Given state and national scope and a constructive program, the real and final test of a national association is likely to come in its ability to maintain a strong organization qualified to carry out the program. I think the chances for this are also good, because here again the state and national organizations will be combinations of local units that have already demonstrated their ability to maintain a good organization, and secondly, because it appears that it will be comparatively easy to finance such an organization and program.

It is clear, however, that no single organization can possibly fulfil purposes of such a diverse character as those originally outlined in the constitution of the American Farm Bureau Federation, or those suggested by many extension directors as the purposes of the federation in their States. These purposes embrace three widely different purposes—education, business and politics—which are not always compatible. Neither can the organizations best suited to carry them out be the same or even alike. One close student of rural organization states the situation clearly:

"Agricultural education, agricultural business and agricultural politics, must each be organized for their respective purposes. No one organization can successfully combine all these functions. This fact has been abundantly shown in the experience of the church, of the grange, and of organized labor. The whole nature and structure of the organization differs according

to the purposes for which it is created. The success of the farm bureau over other agricultural organizations has been chiefly due to paid expert executive leadership. This leadership has been trained and chosen for educational purposes.

"Business organizations must be highly centralized in administration and responsibility, must have executives with business knowledge and ability, and the constituency must have binding financial and legal responsibility to the organization.

"Political organization must solidify and bring to bear public opinion of the voting constituency on its representatives and must make sure of electing one who is loyal to its interests and who has legislative ability. It requires political sagacity in its leadership.

"Each of these three fields of activity requires a different form of organization and a different type of leadership. The one can not undertake the rôle of the other without endangering its best success in its own field."

4. *What are some of the dangers to be avoided?*

There are some outstanding dangers that the state and national federations will have to face and overcome before they can become strong. I believe the principal dangers are four in number:

(1) Enthusiasm for the idea without a definite plan or program of work.

(2) Too much money not carefully budgeted and used for constructive purposes or properly accounted for but employed primarily to build up a great overhead organization which will offer opportunities for personal advantage and ambition.

(3) Failure to remember that the strength of the state and national units rests largely in the thousands of individual members in the local units back home and to keep these average men in the closest possible touch with the organization.

(4) Getting away from the original and vital educational purpose of the organization by yielding to the ever present temptation to enter the more popular fields of business and partisan politics.

5. *What then should be the program of state and national federations?*

I believe that this program should be one of building up and strengthening the farm bureau organization, beginning with the local county units of the best farmers, for the primary purpose of carrying out a constructive educational program for the improvement of agriculture, in which there will be utilized every facility of science and practice, including a partnership with the public agricultural institutions, in carrying forward the program.

The aim, if carried out, answers the question of what the relationship between a college of agriculture and a state federation of farm bureau associations should be.

Finally, three things are essential:

(1) There must be a strong, independent farmers' organization to act as a partner with the public institutions, over which the college has no real control except to expect from its partner (the county association) such conduct as one partner has a right to expect of another.

(2) Every state federation and the national federation must have a vital program which must be primarily educational in character, carefully arrived at after proper consideration.

(3) Federations, especially the national federation, must have definite

budgets which will show how they propose to use the considerable sums of money that will probably be available. Money and enthusiasm alone will never make the substantial progress that is imperative.

THE CHAIRMAN. The discussion will be continued by Vice-Director W. F. Handschin of Illinois.

THE RELATION OF THE COUNTY AGENT TO THE FARM BUREAU AND THE  
RELATION OF THE COLLEGE TO THE STATE FEDERATION

BY W. F. HANDSCHIN

THE COUNTY AGENT AND THE FARM BUREAU

In discussing the relation of the county agent to the farm bureau, we must have in mind a somewhat definite understanding as to the nature and function of both of these agencies. In my discussion of this question I shall have in mind primarily the conditions as they exist in Illinois. The general relationship, however, will be essentially the same in practically all the other States.

The county farm bureau as it is conceived in Illinois is a county-wide organization of farmers having for its object the improvement of agricultural and rural life in all its various aspects. It is designed to develop in the largest possible measure local initiative and local responsibility, both financially and otherwise. It is an organization of farmers who have banded themselves together to study their problems and to develop the most effective means for successfully working out the problems of production, distribution and the general advancement of farm life in their county.

The farm bureau may concern itself with any or all of these problems. Its program includes both educational work and almost any form of service required by the farmers which it is in a position to carry on effectively.

One of the chief lines of work, in fact much the most important one in the beginning has been the employment of a county agricultural agent. These county agents are employed jointly by the United States Department of Agriculture, the State College of Agriculture and the local farm bureaus. While a considerable, or even the major, part of the salary of the county agent is usually paid from state and federal funds, the larger portion of the total cost of carrying on the work of the farm bureau is met from local funds, either from county funds appropriated for this purpose or from individual membership fees, or both. In nearly all Illinois counties practically all of the funds raised within the county are derived from the individual farm bureau memberships.

County agents, in so far as I am informed, are selected almost everywhere by the local farm bureaus. In most states certain standard qualifications are required by the extension division of the State College of Agriculture in order to secure the release of federal and state funds to be used in payment of a part of the salary.

The immediate responsibility of the agent, so far as the detailed administration of his work is concerned, is to the executive committee of the farm bureau or such other administrative part of the organization as may be charged with the execution of the details of the program. This conforms

not only to sound administration but to necessity, since such executive committee is on the ground, and in much closer touch with details than the college can possibly hope to be. Our experience indicates that unless the local committee actually assumes such responsibility and keeps in close touch with the work, it can not thrive.

The general program is usually shaped cooperatively by the representatives of the extension service and the local farm bureau. In general, however, the initiative of the executive committee and the bureau members has been fostered. It is desired that they take as large a part as possible in the planning of the work. This is essential to its successful conduct. According to this plan, the county agent becomes the joint employee of the bureau and the extension service, responsible to the former in so far as general direction and supervision are concerned and to both for the execution of the program mutually agreed upon.

The county agent to a large extent is a public servant. His salary is paid in part from public funds and may be used in part or entirely as a bookkeeping offset to such public funds as are provided by the Smith-Lever Act. On this account, his legitimate activities are hedged about by certain limitations. Because his salary and other costs of maintenance are in part or wholly derived from public funds, he can not legitimately engage in purely commercial transactions which have no real educational value or justification. He is primarily an educator in the broadest sense of the term.

This statement does not imply that he may not engage in many activities directly related to problems of distribution as well as of production. Indeed, many Illinois county agents of late have most earnestly studied distribution problems. They have rendered much effective service, for example in organizing cooperative farmers' grain elevator associations, cooperative livestock shippers' associations, milk shippers' associations, fruit growers' associations and similar organizations whose primary functions are distributive rather than productive. I regard this as the highest type of educational work, inasmuch as it assists farmers in the solution of their problems of distribution, problems which must be solved if the consumer is to secure food at the lowest possible price.

The farm bureau, on the other hand, has no such limitations. It may employ other men who are not paid from public funds; in fact, a considerable proportion of the bureaus do employ such men to take up special lines of work either in production, distribution, or both. Possessing its own funds, it feels free to take up any activity which may contribute to the more successful carrying on of the farm business of its individual members.

A common idea at the outset was that the farm bureau might serve as a purchasing agency for the various commodities which farmers buy. Much service has been rendered along this line, particularly in the purchase of seed, feed and fertilizer, but these constitute only a minor part of their commercial activities. Their chief commercial enterprises have dealt in the main with the development of organizations to further special interests; for example, farmers' cooperative grain elevators, livestock shippers' associations, farm loan banks, etc. The bureau has served as a coordinating agency to assist in developing whatever organizations seem necessary in order to meet the problems confronting the farmers.

The farm bureau itself is not a logical agency for the purchase and

distribution of general farm supplies. The local farmers' elevator, or some such institution, is a more logical distributing center for such supplies as the farmer may wish to purchase in a cooperative way.

The county agent may take a large part in assisting to develop such organizations, and the bureau may even carry on some of them at the outset; but the latter is not the county commissary, nor is the former the county quartermaster.

#### THE COLLEGE AND THE STATE FEDERATION

The college has no technical or official connection with the state federation. Inevitably, however, if the latter plans to handle state-wide agricultural problems there must exist a basis for mutual cooperation. A few illustrations of the experience in Illinois may serve to make clear what may be expected from this relationship. In Illinois, for example, we have been developing for many years a permanent system of soil fertility in which the use of ground limestone and raw phosphates has a primary position. Owing to the greatly increased demand for these products, it has been impossible during the past few years to secure enough of them to meet the demands. The state federation now plans to develop sources of supply of both materials, and to assist in every way possible in their distribution. Thus it is evident that the college program, which has been built up by much investigational work and a prolonged educational campaign, requires for its full realization the cooperation of an agency to assist in the production and distribution of the materials required to carry it out.

The college has also been long interested in better methods of marketing farm wools. It remained, however, for the state federation to develop a plan to carry into successful operation a state-wide cooperative organization for wool marketing.

The college has been studying in a preliminary way problems of land tenure which are vitally important in Illinois agriculture. The state federation is at present actively cooperating in bringing about a better understanding of the relationship between landlord and tenant.

Other illustrations could be given to show how the college may logically look to the federation to carry into execution various plans based on its research work.

Another important consideration which I wish to emphasize especially is the question of developing research in our state institutions on the basis which is really required to meet the complicated problems which now confront agriculture. The greatly increased activities in agricultural extension and the resultant demand for trained men have seriously crippled the work of investigation. This situation has been still further aggravated by the tremendous influx of students. And, finally, college and station appropriations have not increased proportionately to the increased cost of doing business. The budgets of all of our research institutions must be greatly increased if their work is to be restored to the prewar basis, to say nothing of the extension which must necessarily be made if the many new and complicated problems constantly arising are to be solved.

The colleges must have the support of the most intelligent and progressive farmers, of all organizations which can lend their influence to the furthering of research programs. This is one of the large opportunities of



state federations. Unless such organizations carefully study the need of our research institutions and help to secure their more adequate support, it is evident that their work will be seriously crippled, a most unfortunate condition at a time when we need as never before more exact information regarding agriculture.

It is clearly apparent that the state federations need the state colleges to furnish them with exact technical information and the state colleges need state federations as well as other organizations of farmers to help to carry into execution the general policies they advocate. If this cooperation can be developed on a constructive basis, it will result in the greatest possible advance in agricultural practice and in increased agricultural prosperity.

**THE CHAIRMAN.** Mr. S. L. Strivings, President of the New York State Federation of County Farm Bureau Associations, will continue the discussion.

#### THE RELATION OF THE COUNTY AGENT TO THE FARM BUREAU AND OF THE COLLEGE OF AGRICULTURE TO THE STATE FEDERATION

BY S. L. STRIVINGS

##### RELATIONSHIP

There are two distinct yet intimately related interests involved in this work, namely, the educational institutions and extension services, represented locally by the county agents on the one hand, and the farmers, either singly or banded together in association on the other hand, representing the actual farm operations and interests for the benefit of which the first exists. The farmers might exist alone but with distinct loss; the extension services, however, are valueless by themselves unless closely related to the farmer and his problems.

The strength of this whole movement lies in the fine appreciative spirit of genuine cooperation manifested by all concerned. The scholar or student may derive personal satisfaction from the possession of or seeking after knowledge, but such knowledge can become of real value to the world only when it is imparted to others. Now as a matter of fact but a very small portion of the service which it is supposed has accrued as a result of scientific agricultural investigation and experiment has actually reached the farmers in whose behalf it was carried on. When crystallized into carefully prepared bulletins, the statements were read by the few but failed to reach the many. Now the whole farm bureau system was created in order to carry this service effectively to the real farmers and to aid them in organizing a piece of rural machinery which would enable them, through the service of a trained man, namely, the county agricultural agent, to relate so far as it seems practicable the results of the best scientific research in agriculture to their own problems upon their own farms. The worth of such service and its exceeding value to the whole scheme of farm bureau work must be clearly seen and appropriated if satisfactory results are to be secured.

##### COUNTY AGENT

This plan places the county agent naturally at the head of the educational work of the farm bureau and limits his work in the main to that

special service. Outside of this his field of service is relatively narrow. He may aid in setting up special service organizations within his county which will enable him the better to serve his clientele or which will furnish a purely local medium through which a specialized need may be met. He may consistently give publicity to such matters as are of interest to or affect the agriculture of his county. And he may cooperate in studying economic problems touching the interests of his county as a whole.

He is specifically a public servant. Serving as he does three masters, the proper representatives of the public institutions should possess the right to determine who he should be and as to his fitness educationally and otherwise to fill the position. In like manner, his employment should be passed upon by the executive committee of the farm bureau and it should determine in conjunction with the extension service people, both the character of the work to be done and the fitness of the man chosen to do it.

Perhaps an illustration may serve to set forth my own thinking as to the proper relationships of the county agent to the parties whom he represents and serves. Take, for instance, a teacher. He acts as a medium for passing on to those he serves the thoughts of other men. The library stands back of him as well as do the researches of those whose knowledge he seeks to make available. Now, in a way, the county agent resembles the teacher. His class is made up of the farm families of his county which, cooperating with him and working under his guidance, undertake to solve the problems of the fields and homes. Back of him stand not only the dead volumes of the library, but a virile active army of trained specialists through whom agricultural colleges, the experiment stations and research laboratories are pouring the rich treasures of human study in the service of mankind. The investigators themselves stand ever ready to carry to the farm, in person if necessary, through our splendid extension services the very best and latest information which they have secured. The county agent's office thus becomes the agricultural clearing house for his county, a living, vitalizing force to impart and to make available the best thinking of the day and to guide the farmers in its application to their individual problems.

#### THE COUNTY ASSOCIATION

The county association which conjointly with the Federal Department and the State College employs the county agent, is primarily the farmers' organization. Aside from this cooperative relationship entered into for the purpose of carrying forward the educational program, its communities singly or unitedly, may engage in commercial activities which are quite outside the province of the county agent or of the federal or state co-operating agencies. These activities, this economic line of work, may become part of the service which state or even national federations may render to the farmers. In this connection, the county agent can do no more consistently than to supply information and guidance. He can set forth the value of such work and urge that it be put into operation as a part of his educational activity, without engaging directly in its execution. The fact that both State and Federal Governments maintain departments established for the purpose of aiding farmers and other citizens to form cooperative enterprises organized under specific acts, is sufficient evidence of the approval of the public partners of the farm bureaus to proper action on their part

under the general guidance of, but without the direct participation of, the county agricultural agents.

#### NEED OF THE SERVICE

No argument is needed in order to justify this service. The pressing nature of modern farm problems, the nation's need of a prosperous agriculture, the increasing numbers who are passing from city environments into country life, the scientific and technical information which is required if farm affairs are to be dealt with adequately; all these imply that the solution of the problems of the farmer can be committed only to trained specialists in much the same manner as is the study of human ailments committed to the specialists in our great medical colleges and Rockefeller institutes.

The county farm bureau association when at its best will cooperate with the agent in attempting to solve the problem of its own agriculture and to make more effective the service the agent seeks to render. When this association is united with those located in other counties within the State, in the formation of a state federation, we have a state-wide farmers' organization capable of taking account of all matters affecting farm interests as a whole. Agriculture is so indissolubly bound up with all other national interests that this larger organization will naturally study state and federal problems affecting the farmer's welfare. The College of Agriculture stands as the exponent of all that is best in agricultural information and help and with it the state federation should be on terms of greatest intimacy. Its members, however, should not so stand in awe of the college people as to neglect to check up their findings in terms of actual farm practice, or to test on the farm the validity of classroom teaching and scientific findings. No sane student despises or underestimates the library from which his teacher derives his knowledge and; similarly, no farmer or farmers' organization will fail to appreciate the worth of the college as the source from which he directly or through his county agent derives his most accurate information touching modern farm operations. Every keen student in his relation to his teacher is an investigator, aids him and perhaps enlarges the fund of human knowledge by his observation; and, similarly, each farmer is or should be an investigator in his way and should aid his county agent by giving him the benefit of his experience and should realize that the college needs, welcomes and will profit by his cooperation and advice, for he is testing out in practice the more or less theoretical suggestions of the college and station.

If it would best serve its constituent farmers the state federation should cordially cooperate with the state college. As its work develops it will increasingly enter upon the field of economic study and interrelationships. The college should be able to supply to the federation plans for such work and to furnish expert advice which will, of course, as in the case of other suggestions made by the college, be submitted to the acid test of actual practical experience.

State federations are mass formations for state-wide action upon broad agricultural policies which have to do with problems touching the interests of agriculture as a whole. It is but reasonable to suppose that many of these problems may not, at first thought, be deemed to be purely agricultural in their nature; indeed, they may not be agricultural at all; yet they may

consistently challenge farmers to united action. Perhaps unconsciously, farmers have felt that many problems of vital interest to state- or nation-wide agriculture can be understood only by a few select statesmen, self-appointed to act as monitors of the nation's thinking along these lines. And, as a result, the Nation has suffered distinct loss.

It will be greatly to our advantage if the combined sense of the farmers can be directed to the solution of great economic problems. These are quite certain to vex us in the future even more than in the past or today, and unless united sanity is opposed to united insanity we will be co-sufferers with those who, pursuing the impossible, will bring confusion and loss upon us all.

Monetary and commercial affairs are not the only lines of economics with which the nations need to deal. They must study and we must study agricultural economics, the conservation of national morality and health, the fundamental considerations upon which our national perpetuity rests. It is very doubtful whether farmers much longer can permit organized selfishness which seeks to give little and asks much to remain unchallenged in our national life. While state and national federations should interest themselves primarily in agricultural and educational programs yet are they not absolved from the obligation to do their utmost in the conservation of the Nation itself. Their members know how fallacious is the program of greed which would sacrifice the weal of the many to the selfishness and ease of the few, and they must oppose such a program to the fullest extent of their powers. Agriculture in the interests of the Nation must lend itself unitedly to the furtherance of a program of sanity. There is no real difference economically between the idle rich and the idle poor. Farmers should look with no more favor upon the loafing laborer who is supposed to earn his bread by the sweat of his brow than upon the loafing gentleman who gets his bread as a result of the sweat of the brows of other men.

Perhaps this statement on my part will sufficiently suggest my conception of the ways in which I believe that state and national federations can serve the colleges which train young life and shape its thinking, can serve its more immediate constituency, the farmers, and can serve the Nation as a whole. Public thought is slowly crystallizing such a program whose foundation may briefly be stated as follows: "The creation and maintenance of such conditions of living upon the farms of the Nation as will insure their operation by an intelligent and loyal citizenship whose reward shall be as ample and whose conditions of living shall be as satisfying as those enjoyed by any other portion of our people."

It has been well said that "The failure of this aim means an agricultural peasantry. This might mean cheaper food but it would be a blow at the intelligence and initiative of the Nation." Again the indications are that the principal means of developing the program is to be through education. No class of citizens has ever shown the appreciation of the value of education that has been shown by farmers. No class of citizens supports the industrial and trade schools so enthusiastically. In no phase of education are the teachers so closely in touch with the people they teach.

Such will be the service of the farm bureau in its manifold forms when its work and worth are better understood. Founded upon a program of education, it naturally finds ready acceptance on the part of the farmers. If its program is kept integrated with that of those educational agencies

best calculated to give it new life blood it can not fail to do increasingly effective work in behalf of agriculture. It is conceivable that in some matters the farmers may outrun the colleges and challenge them to new work to determine the validity of the facts they furnish, to prove their case; for as a rule, farmers know results when they see them. And with this knowledge they need only to be fortified with well-digested facts to enable them successfully to controvert the fallacies touching agricultural affairs now so commonly held in the public mind and so widely diffused by an ill-informed and often prejudiced city press.

After all is said and done, all that we do has value only in terms of men and women. Every action tending towards the betterment of life's conditions finds its final test not in what it will produce in wholly material things but in the measure of how far and in what way it will best serve the lives of men.

THE CHAIRMAN. Mr. W. A. Lloyd of the Office of Extension Work, North and West, United States Department of Agriculture, will close the discussion.

WHAT SHOULD BE THE RELATIONSHIP OF A COLLEGE OF AGRICULTURE TO A  
STATE FEDERATION OF FARM BUREAUS?

WHAT SHOULD BE THE RELATIONSHIP OF THE COUNTY AGENT TO THE  
FARM BUREAUS?

BY W. A. LLOYD

Before undertaking to answer the question, "What Should Be the Relationship of a College of Agriculture to a State Federation of Farm Bureaus," we will try to determine what the relationship of the College of Agriculture has been to the federated bodies, that is the county farm bureaus, for it would seem to be axiomatic that the state federation would be limited in its activities and consequently in its relationship by the field of work of the federated bodies, else it is not a federation of organizations; although it might possibly be a federation of their members.

The first farm bureaus were in the main creatures of chambers of commerce. They were purely artificial organizations, the primary purpose of which was to help raise funds to employ a county agent. There were often as many city men as country men in the organization, and the name "farm" as a part of the terminology of the bureau was about as much of a joke as the term "agricultural" is in the name of a county agricultural society which promotes an annual horse trot and an inexpressible midway. The bureau as a rule ceased to function as soon as the membership fee was paid and unwillingly came back to life when the next installment was due. There were different degrees of inactivity in the early bureaus but in the light of present day ideals, and without any disrespect to those who promoted them or those who composed them, they may be considered as passive organizations.

The primitive county agent was an individualist who rendered personal service. He gave and sometimes got "direct action." The county agent, as his name implied, represented somebody and that somebody was the College of Agriculture, or, since the college often had no funds and was only nominally a cooperating party, the agent often considered himself, and was considered by the public, as the direct agent of the United States Depart-

ment of Agriculture. The farm bureau was the creature of the county agent. It was of him and by him and for him. [It helped him when he asked its help in arranging meetings and probably he paid a little more attention to the members of the farm bureau than to the general public. Indeed, in Illinois, where the membership fee was relatively high, the agent originally worked exclusively with the farm bureau members in some counties. The relationship at the beginning of the work, let us say previous to 1914, was very simple. The county agent represented the college and the Department of Agriculture in making available to the farmer the discoveries of agricultural research and in their application to farm conditions. The farm bureau was simply the agent's machine. It had little or no relation to the Agricultural College or to the Department of Agriculture. Indeed in the solicitation of funds from county commissioners, college authorities frequently went direct to them and made a personal appeal for funds without counselling or even informing the farm bureaus.

Having thus set out what appears to have been the relationship of the county agent to the College and Department, and the relation of the county agent to the farm bureau at the inception of the work, let us see how it has been modified as the work has developed.

The Agricultural Extension Act of 1914 cleared some of the haziness which obscured the relation of the College of Agriculture and the United States Department of Agriculture to extension work in the States. It established and made provision for the enforcement of cooperative agricultural extension work between the Agricultural Colleges in the several States and the United States Department of Agriculture. As this great Act is fundamental to the whole subject under consideration, it may be worth while to refresh our minds with its purposes to furnish a background to our whole thesis. In defining the work to be conducted, the Act provides:

"That cooperative agricultural extension work shall consist in the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or residing in said colleges in the several communities and imparting to such persons information on said subjects through demonstrations, publications and otherwise."

The Act itself says nothing of county agent work or farm bureau work but leaves the means for carrying it out "in such a manner as may be mutually agreed upon by the Secretary of Agriculture and the state college or colleges receiving the benefits of the Act." While the Act itself says nothing of the immediate agencies of its execution, Congressman Lever, the chairman of the House Committee on Agriculture, who piloted the bill through the House, in presenting the bill from the Committee, makes this clear. He says:

"\* \* \* The theory of this bill is to extend this system of itinerant teaching, the state always to measure the relative importance of the different ideas or activities to be pursued and to determine upon the most important to the entire country, by at least one trained demonstrator or itinerant teacher for each agricultural county who in the very nature of things must give leadership and direction along the line of rural activities, social, economic and financial. This teacher or agent will become the instrumentality through which the colleges, stations and the Department of Agriculture will speak to those for whom they were organized to serve with the respect due all lines of work engaged in by them."

It seems clear from the above, as well as from the remarks of many other members of both the House and the Senate that Congress had in mind that the "trained demonstrator for each agricultural county" would be the official representative of the College and Department.

In the elaboration of his remarks, Mr. Lever makes clear that the purpose of the bill was to reach the whole farm family, the man, the woman and the child, and to cover the economic as well as the productive phases of farm life. Though not immediately germane to the subject under discussion, Mr. Lever's remark in regard to the economic work which might be undertaken is so applicable to the general situation which brings about this discussion at this time that it is worth quoting here:

"To teach the farmer the best methods of increasing production is exceedingly important but not more vitally so than is the importance of teaching him the best and most economical methods of distribution. It is not enough to teach him how to grow bigger crops, he must be taught to get the true value for these bigger crops, else Congress will be put in the attitude of regarding the work of the farmer as a kind of philanthropy. The itinerant teacher or demonstrator will be expected to give as much thought to the economic side of agriculture, to marketing, standardizing and grading of farm products as he gives to the matter of larger acreage and yields. He is to assume leadership in every movement whatever it may be, the aim of which is better farming, better living, more happiness, more education and better citizenship."

The passage of the Agricultural Extension Act and its acceptance by the States, greatly enlarged the field of extension administrators and extension workers and made necessary the development of some local organization in the counties if the last man on the last farm was to be reached. Various private organizations of farmers were available in the States and various methods were tried out in cooperation with them. The colleges and the county agents approached independent farmers' clubs, subordinate granges, locals of the Society of Equity and the Farmers' Union and county school supervisors and superintendents and even Sunday schools in making arrangements for carrying on extension work. The cooperation of these organizations was generously extended for the most part and good results often secured. The chief difficulty with this plan seemed to be that these private organizations were probably primarily concerned with their own programs and only incidentally with the proposed extension program. The activities with which these organizations were most interested in were either social, political or economic, i. e., cooperative buying and marketing. Only on the last subject did they touch the work of the county agent and here he was least able to help them because neither the Department of Agriculture nor the Agricultural Colleges had at that time made any extensive studies of the subject or, indeed, possessed much to be extended. It seemed if effective work was to be done that some distinct local agency must be developed whose main, if not whose sole, aim would be extension work in agriculture and home economics. The farm bureaus which up to this time had been developed largely to help finance the movement, which assistance was still necessary owing to inadequate state and federal funds to meet the demands of the rapidly expanding work, were here and there showing signs of life. The agents reported they were finding the executive

committees of some of these associations extremely helpful in determining what to do and how to do it.

The most progressive of these farm bureaus began to develop what were called "advisory councils" which were in reality committees the purpose of which was not only to help extend the work but also to help determine the things that were to be extended. The Farm Demonstration Monthly, a monthly review of county agent work published by the Department, in its issue of May 1, 1915, speaks of the new life that was coming into the farm bureaus. Quoting a county agent speaking at a state conference, the article says:

"The farm bureau when I undertook the work, was a skeleton organization with officers but no membership. It was 'skeleton' in more ways than one for so far as effective work was concerned it was a 'dead one.' I was supposed to build up the organization."

Then after accounting the difficulties and opposition he had encountered during his year's work, he says:

"The fight has been won and we are all right again, and, while I do not care to go through such a fight again, I am glad it happened. The farmers are now behind the work in an organized capacity, not a 'skeleton' organization but a real live organization of farmers who know what they are about."

The last phase is a most significant one—"farmers who know what they are about." It was the realization and recognition of this fact on the part of extension administrators in the Department and the States that revolutionized both ideals and methods of extension work. The next two years were years of rapid change or, rather, crystallization of ideals. Farm bureaus began to be organized rapidly and old ones to be reorganized on the basis of becoming a cooperating partner with the Agricultural College and the Department in extension work. The farm bureaus became more rural in character and betrayed less of the flavor of the chamber of commerce, and farmers who were somewhat reluctant or even openly opposed to the extension movement as a superimposed or uplift agency entered wholeheartedly into it as they became a vital part of it.

Quotation would be tiresome but the whole literature of the county agent and farm bureau movement since 1914 has been full of plans for securing the largest possible participation of farmers and their families both in the planning and the execution of the work. So different indeed was this from the original idea that it came to be spoken of as the "new" farm bureau. An expression of this great and fundamental change is summarized in a quotation from a circular of the Department "Status and Results County Agent Work 1917." It says:

"The position of the farm bureau as the local extension unit of the Agricultural College which was pointed out in the report for 1916 is now clearly and quite generally recognized. It is now in fact what it was then hoped it might ultimately become, the recognized agency through which the Agricultural College and the Department cooperate in all extension work in the county whether that work be with the farm crops, farm animals, the problems of home and community life. Instead of being merely an aid to the county agent work it has become a local institution, educational in character, for administering and directing the work in agriculture and home economics in the county and for participating in the plans for the planning and execution of such work.



"The people in an organized capacity have thus become full partners in all that is undertaken in the country for the improvement of agriculture and the advancement of home life. Through the farm bureau they have assumed a responsibility which properly belongs to them, that of directly participating in determining what shall be undertaken in helping to develop the plans, in personally assisting in carrying through the agricultural improvement program. The realization of this ideal which is the outstanding development of the year has been made much easier by the impelling necessity of the war. County agent work has been steadied and strengthened because of its security in the confidence and affections of the people it was created to serve.

"The county farm bureau is an institution for the development of a county program of work in agriculture and home economics and for co-operating with state and government agencies in the development of profitable farm management and an efficient, wholesome community life. It is organized agricultural democracy."

It is safe to say that no governmentally fostered movement in this or any other land ever made a more determined or successful effort to arouse popular interest and promote effective cooperation, leaving at the same time in the hands of the people it served the largest possible initiative and obtaining a maximum of performance. Even under war conditions, the partnership of organized farmers was recognized and secured. The Department of Agriculture was given a large grant of emergency funds to stimulate food production as a war measure. The emergency county agents might have been arbitrarily appointed by the Department without co-operating with local farmers. Such a course would have been easiest and quickest and such a course was strongly urged, but so sure were the national leaders that the plan of local initiative and local responsibility was right, that they deliberately chose the more difficult road. The emergency work was started practically everywhere in the Northern and Western States on the same basis as the regular county agent work; that is the organization of a county farm bureau was made a necessary preliminary to the appointment of an emergency agent. To be sure, the work of organization had to be hurriedly done—the war would not wait—and often little time could be devoted to securing a self-developed program. The Government itself had a war program in agriculture and it was largely the part of these war-time farm bureaus to determine what part they could best play in the federal program. Within a few months after the emergency appropriation was available, the number of county agents in the North and West had increased from approximately 500 to more than 1,100, and the number of farm bureaus from about 300 to nearly 800.

No encomium is necessary on the war work of the American farmers. They did all and more than was asked of them and they did it with less noise and less spectacularism than pertained to any other war activity. No kind of propaganda was more difficult or more successful than that carried on by the county agent and other extension workers through the farm bureaus, and none has received less recognition on the part of the public or the Government.

This crystallization of ideals in regard to the county farm bureau as an official extension agency which was securing recognition in the Colleges and the Department and with the farmers was being reflected in the laws

of the various States authorizing county agent work. Most of the early laws on the subject simply authorized county commissioners to appropriate a certain amount of money for carrying on county agent work. The money was paid direct to the county agent from the county treasurer on warrant from the county commissioners. No local organization was recognized. The first change noted in state legislation was the making of county appropriation dependent on the organization of some local association with a certain number of members, the money still being paid direct from the county treasury. Later, in a few states, recognition began to be given to the bureau through authorization in state laws to prepare a budget and to pay out funds appropriated to it and to render an account to county authorities.

The most significant and advanced legislation is that of last winter as reflected in the laws of Maine, Minnesota, Montana, Nebraska, New Mexico, New York and a few other States. A review of all state legislation affecting farm bureau work would be most helpful in determining the legal status and relationship of the farm bureaus to the Agricultural Colleges. The limitations of this paper will not permit of such a review. The laws are for the most part amendments of former statutes which fact complicates any attempt to brief the subject. The State of Maine happily had no previous legislation touching farm bureaus and passed an original act which was approved March 12, 1919. Its provisions follow the same general lines as the amended laws in several other states. The law is brief and its terms so pertinent to the question under discussion that I am quoting it practically in full. It reads as follows:

AN ACT to provide for Cooperative Agricultural Extension Work Between the Several Counties of Maine and the University of Maine, College of Agriculture, in Accordance with the Federal Agricultural Extension Act of May Eighth, Nineteen Hundred and Fourteen, Entitled "An Act to Provide for Cooperative Agricultural Extension Work between the Agricultural Colleges and the United States Department of Agriculture."

Be it enacted by the People of the State of Maine, as follows:

SECTION 1. That in order to aid in diffusing among the people of the State of Maine useful and practical information on subjects relating to agriculture, home economics and rural life, and to encourage the application of the same, there may be inaugurated in each of the several counties of the State of Maine extension work which shall be carried on in cooperation with the University of Maine, College of Agriculture.

SEC. 2. Cooperative agricultural extension work shall consist of the giving of practical demonstrations in agriculture and home economics, and imparting information on said subjects through field demonstrations, publications and otherwise; and this work shall be carried on in each county in such manner as may be mutually agreed upon by the executive committee of the farm bureau of such county, provided for in section three of this act, and the trustees of the University of Maine, College of Agriculture, or their duly appointed representatives.

SEC. 3. That for the purpose of carrying out the provisions of this act there may be created in each county or combination of two counties within the State of Maine an organization to be known as a "farm bureau" in the following manner: Whenever a number not less than two hundred of bona fide rural residents within any county or combination of two counties in the State of Maine shall have effected temporary organization for doing extension work in agriculture and home economics, and shall have adopted a constitution and set of by-laws acceptable to the University of Maine,

College of Agriculture, they shall be recognized as the official body within said county or counties for carrying on extension work in agriculture and home economics within said county or counties in cooperation with the University of Maine, College of Agriculture. Such organization may make such regulations and by-laws for its government and the carrying on of its work as are not inconsistent with the provisions of this act; provided that any county farm bureau or other county organization within any of the counties in the State of Maine that is now doing extension work in agriculture and home economics in cooperation with the University of Maine, College of Agriculture, upon complying with the provisions of this section, shall be the recognized farm bureau of the county or counties where it is located, and provided further that but one such organization shall be formed in each county.

SEC. 4. The executive committee of each county farm bureau shall annually prepare an annual financial budget for the twelve months beginning January first next thereafter, showing in details its estimate of the amount of money to be expended under the provisions of this act within the county or counties for such twelve months; shall submit the same to a vote of the bureau at the regular annual meeting, and, if the budget is approved by a majority vote of the members of the bureau present at such meeting, the executive committee shall submit the same to the board of county commissioners on a date in December approved by said county commissioners, and the county commissioners shall include the amount of this budget in the appropriations by them annually recommended, and levy a tax therefor; provided further that the amount thus raised by direct taxation within any county or combination of counties for the purposes of this act shall be not less than one thousand and not more than two thousand dollars annually. Whenever the inhabitants of the two counties shall unite for organization in one farm bureau the amount of the tax assessed upon each county shall be in the proportion which the number of farm bureau members in that county bears to the total number of members in the two counties so united.

SEC. 5. It shall be the duty of each said county farm bureau annually on or before the tenth day of December, to present its plans of extension work for the ensuing year and to render to both the trustees of the University of Maine, College of Agriculture, and the county commissioners a full detailed report of its extension activities for the preceding fiscal year, including a detailed report of its receipts and expenditures from all sources; and the financial report of such county farm bureau shall be on such forms as may be prescribed by the trustees of the University of Maine, College of Agriculture.

This law, which is substantially a copy of a draft of a law which received favorable consideration from the state extension directors in an informal conference at the Baltimore meeting last year, has for its ideal the county farm bureau as a legal public body for doing extension work. It, in effect, establishes the same relation between the Agricultural College and the county farm bureau as exists between the Federal Department of Agriculture and the State Agricultural Colleges under the terms of the Agricultural Extension Act of 1914.

If this is the relationship of the Agricultural College to the county farm bureau, what should be the relationship of a College of Agriculture to a State Federation of county farm bureaus? Let us examine for a moment how this movement for State Federations came about.

Missouri was the first State to form a state farm bureau. This was done through the organization of the Missouri Association of Farm Bureau Boards which was organized at Slater, Missouri, March 24 and 25, 1915. Paul V. Maris, then county agent in Saline County, Missouri, and now county agent leader in Oregon, was responsible for the idea and for the

organization meeting. Prof. D. H. Doane, then county agent leader in Missouri, in a letter to the writer under date of April 1, 1915, communicating the results of the organization of the state farm bureau, made the first suggestion of a national organization. The Massachusetts Farm Bureau Federation was effected at Worcester on May 11, 1915.

These events mark the beginning of the present state and national farm bureau movement and are worthy of recording as matters of history. The "Farm Demonstration Monthly" of May, 1915, in speaking of this new movement, makes the following interesting comment:

"State meetings of farm bureau officials have recently been held in Vermont, New York, Illinois and Missouri. So far as we know, the Vermont meeting, which was held in October, 1914, was the first of its kind in the development of the demonstration movement. All of these meetings have been devoted primarily to a discussion of such local problems of farm bureau administration as county financial support and how the farm bureau can most effectively assist the county agent in his work of demonstration and the determination of projects. The interest which such meetings as these bespeak makes them in many ways the most encouraging development of the year. The Missouri meeting which was held in Saline County on March 24 and 25, took action which resulted in an organization to be known as the Missouri Association of Farm Bureau Boards, which will hold an annual meeting at the Agricultural College during farmers' week. An organization of this sort has very great possibilities and can easily become the most influential agricultural organization in the State. When a number of states have demonstrated the usefulness of such an organization as this, a sectional or even a national association might be useful. Heretofore most of the talking concerning the county agent movement has been done by department and college officials and by the county agents themselves. It is a very hopeful sign when the "folks back home"—the farmers—who are backing the movement with their time and with their cash and for whom the whole movement is planned, get together in state meetings to consider how they can best assist the county agent in his work."

In commenting on the organization of the Massachusetts federation, the "Farm Demonstration Monthly" of July, 1915, says:

"The state federation marks a distinct forward movement in Massachusetts in the work of cooperation between the business men and the farmers in the attempt to improve conditions. Men conversant with the situation say that it marks a milestone in rural advancement, and they freely predict great progress from the united action which will be secured from the federation. As soon as the counties in other States have been organized and federated it is expected that the New England States will be federated through their state associations into one united whole."

An examination of 21 of the constitutions of state farm bureau federations in regard to the object of the federation and the proposed cooperation with the Agricultural College and the United States Department of Agriculture discloses the following interesting data. The following States are involved in this analysis: Colorado, Connecticut, Idaho, Illinois, Indiana, Iowa, Kansas, Maine, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, Ohio, South Dakota, Utah and Vermont. The constitutions of Arizona and California were not available and were not included. Thirteen of the constitutions

state that the main purpose is practically to develop, strengthen and correlate the work of the county farm bureaus in their efforts to promote the development of the most profitable and permanent system of agriculture, the most wholesome and satisfactory living conditions. Six others make this the primary purpose of the bureau and include also such other objects as legislation in the interest of agriculture, protection of agriculture against unfriendly legislation, direct cooperative buying and selling, the collection of statistics, publication of reports, the maintenance of investigators, marketing and transportation. Two make the extension or educational work of the state federation a mere incident to a program of legislation and cooperative buying and marketing. Eleven provide for a definite program of work in agriculture and home economics as a basis of the whole effort of the federation. Eleven make provision for the extension director or county agent leader or both as members of the executive committee in an advisory capacity, and usually without vote. Five provide for a memorandum of understanding with the State Agricultural College in regard to the program of work. Eight fix the place of annual meeting at the Agricultural College, usually in connection with the state extension conference. Considering, therefore, the history, organization and development of county farm bureaus, their recognized field of work, and the ideals that seem to permeate the constitution of the state federations, it may be said in general terms that a state federation is designed to promote collectively those things for which a majority of the individual farm bureaus stand as it applies to their program of extension work in agriculture and home economics. If this is a correct interpretation of the facts, then the relationships of the county farm bureau and the state farm bureau with the Agricultural College are identical. The state federation is simply for the purpose of making more effective the work of the county farm bureaus. In a sense it may be said to stand in the same relation to the State Agricultural College as the Association of American Agricultural Colleges and Experiment Stations does to the United States Department of Agriculture. In such a relationship, the state federation has a most inviting field of work. The delegates from the various county farm bureaus sitting together in conference or welded together into a federation can do a work that neither the college nor the county farm bureaus acting individually can accomplish. It makes possible a real state program in agriculture and home economics. The state federation must necessarily do its work by committees.

An illustration will serve to show how the state federation works in its relations with the College. Conceive a state with 40 counties all with organized farm bureaus. We will suppose that potatoes are an important market crop in 10 counties with a potato project in the county farm bureau program of work. The state federation of farm bureaus acts in conjunction with the college in appointing a state committee on potato growing to consider the whole potato growing industry throughout the State in its relation to other industries and to profitable farm management; it will consider the potato situation from the standpoint of disease control, insect enemies, soil conditions, labor situation, storage, transportation and marketing; it will call meetings of growers to consider important local problems; it will get at the real problems of the potato industry and recommend remedies; it will help organize the potato projects in the counties; it will help organize growers into marketing associations, assist in collective buy-

ing of fertilizers and spraying materials, etc.; it will investigate conditions at market centers and recommend action to marketing associations. It will not act as a direct marketing agency but will help in bringing into existence such marketing associations as the economic situation demands and help protect these marketing associations from unwarranted attack and interference. Such a committee can easily do more to put the potato industry of a state on a sound economic basis than any other or all other forces combined. It could put real red blood into extension work.

What could be done with the potato industry can be done as well for peanuts or cotton or dairying or hogs or citrus fruits or anything else. Several of the state farm bureaus have just such committees which are beginning to function in the way indicated. In other words, the state farm bureau's excuse for existence is that it is a needed agency in the development of a state program of work, that it has something definite and worth while to do, and that it sets about doing it in a businesslike manner. A state farm bureau federation offers the basis for the rational organization of agriculture on a specialist basis. The coordination of these state projects into a state program is the big job for the executive committee of state federations acting in conjunction with the state director of extension and such specialists as they may call to their aid.

For 50 years there have been agitators and well-meaning reformers who have offered panaceas for all agricultural ills through the enactment of certain legislation, or who would safeguard the great industry of agriculture from those who would exploit it. Many of these movements have come and gone and others are being formulated. Some have left their impress on the industry in a constructive way and have endured, others have enjoyed a few years' popularity and have passed away. Such organizations are helpful and there are several now doing good work. Until the birth of the state federation movement there has been no basic, no state or national organization of farmers to consider the whole industry in a broad way and to cooperate with public agencies in the development of economic farm management and farm practice. Such an organization should consider the problem of the home as well as the farm, for the two are inseparable and must be considered together. Such organizations as the county farm bureaus through the development of community consciousness and state farm bureau federations with broad vision to work for the industry from the standpoint of the welfare of the whole people, are a most encouraging index of the future. There may be some significance in the story of the lark and the farmer. As long as the farmer depended on his relatives and neighbors or friends to cut the wheat, the young larks remained unmolested, but when the farmer told his son "tomorrow we will ourselves reap the grain" the wise mother lark moved her brood to safety.

I am not saying that state and national legislation in the interest of agriculture does not need attention. It often does and with the development of trained leadership in the community committees, the farm bureau committees, the county executive committees and in the state federation, it is likely to get it as a mere incident to the tremendous advancement which the industry will make under such guidance. What is perhaps needed is not so much the enlargement of the scope of the farm bureau as a broad vision of extension work and a genuine spirit of service.

If the foregoing argument is sound, the answer to the last question is

simple. The relation of the county agent to the farm bureau is that of employee to one member of a partnership. The Federal Department of Agriculture delegates to the Agricultural College the power of supervising county agent work and similarly the county farm bureaus should delegate to the Agricultural College the same power. The supervisory power must be centralized somewhere. It can not be divided if the partnership is long to continue. It seems logically lodged with the college; but it is supervision carried out in pursuance of definite plans agreed to with the other two partners in the firm. A memorandum of understanding or series of projects is signed between the college representing the Department and the county farm bureau in which the execution of the work in the county is definitely planned. If the county agent is the employee of the "Department-College-Farm-Bureau Company" he may and often does act as the local director or manager of the firm's business in the county. Although these relations may at times appear complex and their ramifications intricate, they are fundamentally relatively as simple as the relations of three equal though widely separated partners in a business firm with a paid employee to carry on partnership affairs in intimate association with one member of the company.

The extension organization of the United States Department of Agriculture, the State Agricultural Colleges and the Farm Bureaus with its system of county agent work, home demonstration work and club work, is the greatest organization of its kind in any country in the world. It affords the best example of the people entering in an organized and effective way into a governmental activity. It is a thrilling example of popular government with the people actually executing their own laws. Is it not worth preserving in its integrity?

On motion, the following resolution was adopted:

*Resolved*, Inasmuch as the progress of cooperative extension work in agriculture and home economics is largely dependent for subject-matter upon the work of the experiment stations, this Section favors aggressive action by this Association in the interest of further public financial support for research work.

On motion, the Section adjourned *sine die*.

## MINUTES OF THE EXECUTIVE BODY OF THE ASSOCIATION OF LAND-GRANT COLLEGES

The meeting was called to order at 11.40 A. M. on Friday, November 14, immediately following the final adjournment of the Thirty-third Convention of the Association of American Agricultural Colleges and Experiment Stations, by the Acting Chairman of the (former) Section on College Work and Administration of that Association, President R. J. Aley of the University of Maine.

On motion, the officers of that Section were created the officers of the executive body.

Considerable discussion was held as to procedure under the revised Constitution.

On motion, the Chair appointed as committee on nominations of officers for the ensuing year Director W. H. Jordan of New York and Presidents R. D. Hetzel of New Hampshire and W. E. Stone of Indiana.

On motion, a recess was taken until 1.30 P. M.

The meeting reconvened at 1.30 P. M. with President Aley in the Chair.

A resolution interpretive of certain provisions of the Constitution was introduced, and, after discussion, laid upon the table.

On motion, duly seconded, the recommendation of the (former) Engineering Division approving a compromise bill providing for the establishment of engineering experiment stations (page 171) was not approved by vote as follows:

Affirmative 10, negative 18.

On motion, the Association reaffirmed the position taken at the previous convention touching engineering experiment stations (Thirty-second Proceedings, page 160) and instructed the Executive Committee to proceed accordingly.

On motion, the Executive Committee was asked to take cognizance of the proposed federal measure (the Smoot bill, S. 2380) in behalf of home economics experimentation (page 208).

On motion, the Executive Committee was instructed to send the greetings of the Association to the officers of the newly organized American Farm Bureau Federation.

On motion, the recommendations of the Executive Committee made in its initial and final reports to the Thirty-third Convention of the Association of American Agricultural Colleges and Experiment Stations (pages 19, 146) were approved.

On motion, the report of the Special Committee on Military Training presented by W. J. Kerr, chairman, was amended by the elision from the close of Section 3, thereof of the words, "Such compensation should be given either as a direct payment for the time of the camp or as increased commutation of rations during the period of advanced instruction" and by



the addition of a paragraph reading as follows: "4. That a commutation more nearly representing actual cost be given for uniforms and subsistence"; and, the report as thus amended, was received and adopted.\*

On motion, members of the Executive Committee not by virtue of their offices constitutionally eligible to sit in the executive body were invited to sit with it.

The nominating committee reported a list of officers for the ensuing year as follows:

For president: Chancellor Samuel Avery of the University of Nebraska.

For vice-president: President R. J. Aley of the University of Maine.

For secretary-treasurer: Dean J. L. Hills of the University of Vermont.

For Executive Committee: President R. A. Pearson of the Iowa State College of Agriculture and Mechanic Arts; President W. M. Riggs of the Clemson Agricultural College of South Carolina; President W. E. Stone of Purdue University; Dean H. L. Russell of the University of Wisconsin; Dean A. R. Mann of the New York State College of Agriculture at Cornell University.

On motion, the secretary was instructed to and did cast one ballot in behalf of the executive body for the officers above listed and they were accordingly elected.

On motion, the session adjourned *sine die*.

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\*Amendments made in text of report appearing in body of Proceedings.

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# PROCEEDINGS

OF THE

THIRTY-FOURTH ANNUAL CONVENTION  
OF THE

## Association of LAND-GRANT COLLEGES

HELD AT

SPRINGFIELD, MASS., OCTOBER 19-22, 1920

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Edited by W. H. BEAL  
For the Executive Committee of the Association

*Not Class State Universities*



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J. A. WILSON of Oklahoma, *Secretary*.

### *Engineering*

C. R. RICHARDS of Illinois, *Chairman*.

R. L. SACKETT of Pennsylvania, *Secretary*.

### *Home Economics*

MILDRED WEIGLEY of Minnesota, *Chairman*.

EDNA L. SKINNER of Massachusetts, *Secretary*.

## STANDING COMMITTEES

*Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts*

For three years, A. C. TRUE of Washington, D. C., *Chairman*, A. B. CORDLEY of Oregon, BERTHA M. TERRILL of Vermont, and A. A. POTTER of Indiana; for two years, G. A. WORKS of New York, ANNA E. RICHARDSON of Washington, D. C. and F. E. TURNEAURE of Wisconsin; for one year, J. F. DUGGAR of Alabama, MARY E. SWEENEY of Kentucky, and W. M. RIGGS of South Carolina.

*Committee on College Organization and Policy*

For three years, R. W. THATCHER of Minnesota and W. M. RIGGS of South Carolina; for two years, W. M. JARDINE of Kansas and ————; for one year, K. L. BUTTERFIELD of Massachusetts, *Chairman*, and C. A. LORY of Colorado.

*Committee on Experiment Station Organization and Policy*

For three years, ———— and EUGENE DAVENPORT of Illinois; for two years, F. B. LINFIELD of Montana and C. E. THORNE of Ohio; for one year, B. W. KILGORE of North Carolina and E. W. ALLEN of Washington, D. C.

*Committee on Extension Organization and Policy*

For three years, THOMAS BRADLEE of Vermont and K. L. HATCH of Wisconsin; for two years, G. I. CHRISTIE of Indiana and R. S. WILSON of Mississippi; for one year, L. A. CLINTON of New Jersey, *Chairman*, and W. W. LONG of South Carolina.

*Committee on Military Affairs*

For three years, W. H. S. DEMAREST of New Jersey and W. B. BUZZELL of Texas; for two years, W. E. JOHNSON of South Dakota and F. L. McVEY of Kentucky; for one year, W. E. STONE of Indianapolis and ————.

## JOINT COMMITTEES OF THE ASSOCIATION AND THE U. S. DEPARTMENT OF AGRICULTURE

*Committee on Relations*

The EXECUTIVE COMMITTEE of the Association and the COMMITTEE ON STATES RELATIONS of the U. S. Department of Agriculture.

*Committee on Projects and Correlation of Research*

F. B. MUMFORD of Missouri, *Chairman*, A. R. MANN of New York, and H. L. RUSSELL of Wisconsin; with W. A. TAYLOR, J. R. MOHLER, and MILTON WHITNEY of the U. S. Department of Agriculture.

*Committee on Publication of Research*

J. G. LIPMAN of New Jersey, *Chairman*, R. L. WATTS of Pennsylvania, and W. A. RILEY of Minnesota; with K. F. KELLERMAN, E. W. ALLEN, and C. L. MARLATT of the U. S. Department of Agriculture.

## The Land-Grant Colleges, Agricultural Experiment Stations, and Agricultural Extension Services

ALABAMA—ALABAMA POLYTECHNIC INSTITUTE, Auburn. Spright Dowell, *President*; B. B. Ross, *Dean Faculty of Agricultural Sciences*; J. F. Duggar, *Director Experiment Station*; L. N. Duncan, Director Extension Service; J. J. Willmore, *Dean Faculty of Engineering and Mines*.

AGRICULTURAL AND MECHANICAL COLLEGE FOR NEGROES, Normal. W. S. Buchanan, *President*.

TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE, *Tuskegee Institute*. R. R. Moton, *Principal*; G. W. Carver, *Director Experiment Station*; B. F. Hubert, *Director Agricultural Department*; C. J. Calloway, *Director Extension Department*.

ARIZONA—UNIVERSITY OF ARIZONA, Tucson. R. B. von KleinSmid, *President*; D. W. Working, *Dean College of Agriculture, Director Experiment Station*; W. M. Cook, *Director Agricultural Extension Service*; G. M. Butler, *Dean College of Mines and Engineering*; DeRossette Thomas, *Professor in charge of Home Economics*.

ARKANSAS—UNIVERSITY OF ARKANSAS, Fayetteville. J. C. Futrell, *President*; B. Knapp, *Dean College of Agriculture, Director Experiment Station*; M. T. Payne, *Director Agricultural Extension Division*; W. N. Gladson, *Dean College of Engineering*; Stella Palmer, *Head Home Economics Department*.

BRANCH NORMAL COLLEGE, Pine Bluff. J. G. Ish, Jr., *Superintendent*.

CALIFORNIA—UNIVERSITY OF CALIFORNIA, Berkeley. D. P. Barrows, *President*; T. F. Hunt, *Dean College of Agriculture*; C. M. Haring, *Director Experiment Station*; B. H. Crocheron, Director Agricultural Extension; C. L. Cory, *Dean College of Mechanics*; Mary F. Patterson, *Associate Professor of Household Art*.

COLORADO—THE STATE AGRICULTURAL COLLEGE OF COLORADO, Fort Collins. C. A. Lory, *President*; C. P. Gillette, *Director Experiment Station*; H. T. French, Director Extension Service; Inga M. K. Allison, *Head Department of Home Economics*.

CONNECTICUT—CONNECTICUT AGRICULTURAL COLLEGE, Storrs. C. L. Beach, *President*; E. H. Jenkins, *Director Storrs Experiment Station*; H. J. Baker, *Director Extension Service*; M. Estella Sprague, *Dean of Home Economics*.

CONNECTICUT AGRICULTURAL EXPERIMENT STATION, New Haven. E. H. Jenkins, *Director*.

DELAWARE—DELAWARE COLLEGE, Newark. Walter Hulliher, *President*; C. A. McCue, Dean Department of Agriculture, Director Experiment Station, Director Extension Service; Sarah H. Bridge, *Professor of Home Economics, Women's College*.

STATE COLLEGE FOR COLORED STUDENTS, Dover. W. C. Jason, *President*.

FLORIDA—UNIVERSITY OF FLORIDA, Gainesville. A. A. Murphree, *President*; P. H. Rolfs, Dean College of Agriculture, Director Experiment



Station Director Extension Division; J. R. Benton, *Dean College of Engineering.*

FLORIDA AGRICULTURAL AND MECHANICAL COLLEGE FOR NEGROES, Tallahassee. N. B. Young, *President.*

GEORGIA—GEORGIA STATE COLLEGE OF AGRICULTURE, UNIVERSITY OF GEORGIA, Athens. A. M. Soule, *President*; J. P. Campbell, *Director Extension Department.*

GEORGIA EXPERIMENT STATION, *Experiment.* H. P. Stuckey, *Director.*

GEORGIA STATE INDUSTRIAL COLLEGE FOR COLORED YOUTHS OF THE UNIVERSITY OF GEORGIA, Savannah. R. R. Wright, *President.*

HAWAII—UNIVERSITY OF HAWAII, Honolulu. A. L. Dean, *President*; Mae L. Wells, *Professor of Domestic Science.*

IDAHO—UNIVERSITY OF IDAHO, Moscow. A. H. Upham, *President*; E. J. Iddings, *Dean College of Agriculture, Director Experiment Station*; L. W. Fluharty, *Director Extension Division (Basis)*; C. N. Little, *Dean College of Engineering*; Katherine Jensen, *Professor of Home Economics.*

ILLINOIS—UNIVERSITY OF ILLINOIS, Urbana. D. Kinley, *President*; E. Davenport, *Dean College of Agriculture, Director Experiment Station, Director Extension Service*; W. F. Handschin, *Vice-Director Extension Service*; C. R. Richards, *Dean College of Engineering*; Isabel Bevier, *Director of Home Economics Courses.*

INDIANA—PURDUE UNIVERSITY, LaFayette. W. E. Stone, *President*; J. H. Skinner, *Dean School of Agriculture*; G. I. Christie, *Director Experiment Station, Superintendent of Agricultural Extension*; A. A. Potter, *Dean Schools of Engineering*; Mary L. Matthews, *Professor in charge of Home Economics.*

IOWA—IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Ames. R. A. Pearson, *President*; C. F. Curtiss, *Dean Division of Agriculture, Director Agricultural Experiment Station*; R. K. Bliss, *Director Agricultural Extension*; A. Marston, *Dean Division of Engineering, Director Engineering Experiment Station*; Catharine J. MacKay, *Dean Division of Home Economics.*

KANSAS—KANSAS STATE AGRICULTURAL COLLEGE, Manhattan. W. M. Jardine, *President*; F. D. Farrell, *Dean Division of Agriculture, Director Agricultural Experiment Station*; Harry Umberger, *Dean Extension Division*; R. A. Seaton, *Dean Division of Engineering*; Helen B. Thompson, *Dean Division of Home Economics.*

KENTUCKY—THE UNIVERSITY OF KENTUCKY, Lexington. F. L. McVey, *President*; T. P. Cooper, *Dean College of Agriculture, Director Experiment Station, Director Agricultural Extension*; F. P. Anderson, *Dean College of Engineering*; Mary E. Sweeny, *Head Department of Home Economics.*

THE KENTUCKY NORMAL AND INDUSTRIAL INSTITUTE FOR COLORED PERSONS, Frankfort. G. P. Russell, *President.*

LOUISIANA—LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge. T. D. Boyd, *President*; W. H. Dalrymple, *Dean College of Agriculture, Director Experiment Stations*; W. R. Perkins, *Director Agricultural Extension Department*; T. W. Atkinson, *Dean College of Engineering*; Mattie R. Sebastian, *Director of Home Economics.*

SOUTHERN UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE OF THE STATE OF LOUISIANA, *Scotlandville*. J. S. Clark, *President*.

MAINE—UNIVERSITY OF MAINE, *Orono*. R. J. Ale, *President*; L. S. Merrill, *Dean College of Agriculture*, *Director Agricultural Extension Service*; C. D. Woods, *Director Experiment Station*; H. S. Boardman, *Dean College of Technology*; Frances R. Freeman, *Head Department of Home Economics*.

MARYLAND—UNIVERSITY OF MARYLAND, *College Park*. A. F. Woods, *President*; P. W. Zimmerman, *Dean College of Agriculture*; H. J. Patterson, *Director Experiment Station*; T. B. Symons, *Director of Extension Service*; A. N. Johnson, *Dean School of Engineering*; Marie Mount, *Chairman School of Home Economics*.

PRINCESS ANNE ACADEMY FOR COLORED PERSONS, *EASTERN BRANCH OF UNIVERSITY OF MARYLAND, Princess Anne*. J. O. Spencer, *President*; T. H. Kiah, *Principal*.

MASSACHUSETTS—MASSACHUSETTS AGRICULTURAL COLLEGE, *Amherst*. K. L. Butterfield, *President*; S. B. Haskell, *Director Experiment Station*; J. D. Willard, *Director Extension Service*; Edna L. Skinner, *Head Department of Home Economics*.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, *Boston*. Elihu Thompson, *Acting President*.

MICHIGAN—MICHIGAN AGRICULTURAL COLLEGE, *East Lansing*. F. S. Kedzie, *President*; R. S. Shaw, *Dean of Agriculture*, *Director Experiment Station*; R. J. Baldwin, *Director of Extension Work*, G. W. Bissell, *Dean of Engineering*; ———, *Dean of Home Economics Division*.

MINNESOTA—UNIVERSITY OF MINNESOTA, *Minneapolis*. L. D. Coffman, *President*. DEPARTMENT OF AGRICULTURE, *University Farm, St. Paul*; R. W. Thatcher, *Dean Department of Agriculture*, *Director Experiment Station*; E. M. Freeman, *Dean College of Agriculture, Forestry and Home Economics*; A. D. Wilson, *Director Agricultural Extension*; Ora M. Leland, *Dean College of Engineering*; Mildred Weigley, *Chief Division of Home Economics*.

MISSISSIPPI—MISSISSIPPI AGRICULTURAL AND MECHANICAL COLLEGE, *Agricultural College*. D. C. Hull, *President*; J. C. Robert, *Director School of Agriculture*; J. R. Ricks, *Director Experiment Stations*; R. S. Wilson, *Director Extension Work*; B. M. Walker, *Director School of Engineering*.

ALCORN AGRICULTURAL AND MECHANICAL COLLEGE, *Alcorn*. L. J. Rowan, *President*.

MISSOURI—UNIVERSITY OF MISSOURI, *Columbia*. A. R. Hill, *President*; F. B. Mumford, *Dean College of Agriculture*, *Director Experiment Station*; P. H. Ross, *Acting Director Extension Service*; E. J. McCaustland, *Dean School of Engineering*; Louise Stanley, *Chairman Department of Home Economics*.

LINCOLN INSTITUTE, *Jefferson City*. C. Richardson, *President*.

MONTANA—MONTANA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, *Bozeman*. A. Atkinson, *President*; F. B. Linfield, *Dean of Agriculture*, *Director Experiment Station*; F. S. Cooley, *Director Extension Service*; E. B. Norris, *Dean of Engineering*; Pauline Fisk, *Professor of Home Economics*.

NEBRASKA—UNIVERSITY OF NEBRASKA, Lincoln. Samuel Avery, *Chancellor*; E. A. Burnett, *Dean College of Agriculture, Director Experiment Station*; W. H. Brokaw, *Director Agricultural Extension Service*; Olin J. Ferguson, *Dean College of Engineering*; Margaret Fedde, *Chairman Department of Home Economics*.

NEVADA—UNIVERSITY OF NEVADA, Reno. W. E. Clark, *President*; Robert Stewart, *Dean College of Agriculture*; S. B. Doten, *Director Experiment Station*; C. A. Norcross, *Director Agricultural Extension*; H. P. Boardman, *Acting Dean College of Engineering*; Sarah L. Lewis, *Professor of Home Economics*.

NEW HAMPSHIRE—NEW HAMPSHIRE COLLEGE OF AGRICULTURE AND THE MECHANIC ARTS, Durham. R. D. Hetzel, *President*; J. C. Kendall, *Director Experiment Station, Director Extension Work*; F. W. Taylor, *Dean of Agriculture*; C. E. Hewitt, *Dean of Engineering*; Isa A. Greene, *Professor of Home Economics*.

NEW JERSEY—RUTGERS COLLEGE AND THE STATE UNIVERSITY OF NEW JERSEY, New Brunswick. W. H. S. Demarest, *President*; J. G. Lipman, *Dean of Agriculture, Director College and State Agricultural Experiment Stations*; L. A. Clinton, *Director Division of Extension in Agriculture and Home Economics*; A. A. Tittsworth, *Dean of Engineering*; Marie L. Casteen, *Associate Professor of Home Economics*.

NEW MEXICO—NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS, State College. R. W. Clothier, *President, Dean of Agriculture*; F. Garcia, *Director Experiment Station*; C. F. Monroe, *Director Extension Service*; R. W. Goddard, *Dean School of Engineering*; Mrs. R. G. Foster, *Professor of Home Economics*.

NEW YORK—CORNELL UNIVERSITY, NEW YORK STATE COLLEGE OF AGRICULTURE, Ithaca. A. W. Smith, *Acting President of University*; A. R. Mann, *Dean College of Agriculture, Director (Cornell) Experiment Station and Extension Service*; D. S. Kimball, *Dean College of Engineering*; Martha Van Rensselaer and Flora Rose, *in charge Department of Home Economics in the College of Agriculture*.  
NEW YORK STATE AGRICULTURAL EXPERIMENT STATION, Geneva. W. H. Jordan, *Director*.

NORTH CAROLINA—THE NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, West Raleigh. W. C. Riddick, *President*; C. B. Williams, *Dean of Agriculture*; H. W. Kilgore, *Director Agricultural Experiment Station, Director Extension Service*.

THE NEGRO AGRICULTURAL AND TECHNICAL COLLEGE, Greensboro. J. B. Dudley, *President*.

NORTH DAKOTA—NORTH DAKOTA AGRICULTURAL COLLEGE, Agricultural College. E. F. Ladd, *President*; C. B. Waldron, *Dean School of Agriculture*; P. F. Trowbridge, *Director Experiment Station*; G. W. Randlett, *Director Extension Work*; E. S. Keene, *Dean School of Mechanic Arts*; Alba Bales, *Head School of Home Economics*.

OHIO—OHIO STATE UNIVERSITY, Columbus. W. O. Thompson, *President*; A. Vivian, *Dean College of Agriculture*; H. C. Ramsower, *Director Agricultural Extension Work*; E. F. Coddington, *Acting Dean College of Engineering*; Faith R. Lanman, *Head Home Economics Department*.  
OHIO AGRICULTURAL EXPERIMENT STATION, Wooster. C. E. Thorne, *Director*.

**OKLAHOMA—OKLAHOMA AGRICULTURAL AND MECHANICAL COLLEGE, Stillwater.** J. W. Cantwell, *President*; H. G. Knight, *Dean School of Agriculture, Director Experiment Station*; J. A. Wilson, Director of Extension; J. A. Bringham, *Dean School of Engineering*; Ruth E. Michaels, *Dean School of Home Economics*.

COLORED AGRICULTURAL AND NORMAL UNIVERSITY, *Langston*. J. M. Marques, *President*.

**OREGON—OREGON AGRICULTURAL COLLEGE, Corvallis.** W. J. Kett, *President*; A. B. Cordley, *Dean School of Agriculture*; J. T. Jardine, *Director Experiment Station*; P. V. Maris, *Director Extension Service*; G. A. Covell, *Dean School of Engineering and Mechanic Arts*; Ava B. Milam, *Dean School of Home Economics*.

**PENNSYLVANIA—THE PENNSYLVANIA STATE COLLEGE, State College.** J. M. Thomas, *President*; R. L. Watts, *Dean School of Agriculture, Director Experiment Station*; M. S. McDowell, Director Agricultural Extension; R. L. Sackett, *Dean School of Engineering*; Edith P. Chace, *Director of Home Economics*.

**PORTO RICO—UNIVERSITY OF PORTO RICO, Rio Piedras, and COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Mayaguez.** P. G. Miller, *President*; C. E. Horne, *Dean College of Agriculture*.

**RHODE ISLAND—RHODE ISLAND STATE COLLEGE, Kingston.** H. Edwards, *President*; G. E. Adams, *Dean Department of Agriculture*; B. L. Hartwell, *Director Experiment Station*; A. E. Stene, Director Extension Service; R. L. Wales, *Dean Department of Engineering*; Elizabeth D. Bache, *Professor of Home Economics*.

**SOUTH CAROLINA—CLEMSON AGRICULTURAL COLLEGE OF SOUTH CAROLINA, Clemson College.** W. M. Riggs, *President*; F. H. H. Calhoun, *Director Resident Teaching*; H. W. Barre, *Director Experiment Station*; W. W. Long, Director Extension Service; S. B. Earle, *Director Engineering Department*.

STATE AGRICULTURAL AND MECHANICAL COLLEGE OF SOUTH CAROLINA, *Orangeburg*. R. S. Wilkinson, *President*.

**SOUTH DAKOTA—SOUTH DAKOTA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Brookings.** W. E. Johnson, *President*; J. W. Wilson, *Director Experiment Station*; C. Larsen, Director of Extension Division; H. C. Solberg, *Head Department of Engineering*; Edith Pierson, *Professor of Home Economics*.

**TENNESSEE—THE UNIVERSITY OF TENNESSEE, Knoxville.** H. A. Morgan, *President, Dean College of Agriculture, Director Experiment Station*; C. A. Willson, *Vice-Dean College of Agriculture*; C. A. Mooers, *Vice-Director Experiment Station*; C. A. Keffer, Director Division of Agricultural Extension; C. E. Ferris, *Dean College of Engineering*; Nellie Crooks, *Associate Professor of Home Economics*.

AGRICULTURAL AND INDUSTRIAL STATE NORMAL SCHOOL FOR NEGROES, *Nashville*. W. J. Hale, *President*.

**TEXAS—AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, College Station.** W. B. Bizzell, *President*; E. J. Kyle, *Dean School of Agriculture*; B. Youngblood, *Director Experiment Station*; T. O. Walton, Director Extension Service; J. C. Nagle, *Dean School of Engineering*. PRAIRIE VIEW STATE NORMAL AND INDUSTRIAL COLLEGE, *Prairie View*. J. G. Osborne, *Principal*.

UTAH—AGRICULTURAL COLLEGE OF UTAH, Logan. E. G. Peterson, *President*; G. R. Hill, Jr., *Director School of Agriculture*; F. S. Harris, *Director Experiment Station*; R. J. Evans, *Director Extension Division*; R. B. West, *Director School of Agricultural Engineering*; A. H. Saxer, *Acting Director School of Home Economics*.

VERMONT—UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE, Burlington. G. W. Bailey, *President*; J. L. Hills, *Dean College of Agriculture, Director Experiment Station*; T. Bradlee, *Director Extension Service*; J. W. Votey, *Dean College of Engineering*; Bertha M. Terrill, *Professor of Home Economics*.

VIRGINIA—VIRGINIA AGRICULTURAL AND MECHANICAL COLLEGE AND POLYTECHNIC INSTITUTE, Blacksburg. J. A. Buftuss, *President*; H. L. Price, *Dean Agricultural Department*; A. W. Drinkard, Jr., *Director Experiment Station*; J. R. Hutcheson, *Director Extension Division*; S. R. Pritchard, *Dean Engineering Department*.

HAMPTON NORMAL AND AGRICULTURAL INSTITUTE, Hampton. J. E. Gregg, *Principal*; W. K. Blodgett, *Director Agricultural Department*; J. L. B. Buck, *Director Extension Work*.

WASHINGTON—STATE COLLEGE OF WASHINGTON, Pullman. E. O. Holland, *President*; E. C. Johnson, *Dean College of Agriculture, Director Experiment Station*; S. B. Nelson, *Director Extension Service*; H. V. Carpenter, *Dean College of Mechanic Arts and Engineering*; Florence Harrison, *Dean College of Home Economics*.

WEST VIRGINIA—WEST VIRGINIA UNIVERSITY, Morgantown. F. B. Trotter, *President*; J. L. Coulter, *Dean College of Agriculture, Director Experiment Station*; N. T. Frame, *Director Extension Department*; C. R. Jones, *Dean College of Engineering*; Rachel H. Colwell, *Professor of Home Economics*.

THE WEST VIRGINIA COLLEGIATE INSTITUTE, Institute. J. W. Davis, *President*; A. W. Curtis, *Director Agricultural Department*.

WISCONSIN—UNIVERSITY OF WISCONSIN, Madison. E. A. Birge, *President*; H. L. Russell, *Dean College of Agriculture, Director Experiment Station, Director Agricultural Extension Service*; J. A. James, *Assistant Dean College of Agriculture*; F. B. Morrison, *Assistant Director Experiment Station*; K. L. Hatch, *Assistant Director Extension Service*; F. E. Turneure, *Dean College of Engineering*; Abby L. Marlatt, *Director of Home Economics*.

WYOMING—UNIVERSITY OF WYOMING, Laramie. Aven Nelson, *President*; A. D. Faville, *Dean College of Agriculture, Director Experiment Station*; A. E. Bowman, *Director Extension Work in Agriculture and Home Economics*; E. G. Hofer, *Professor of Mechanical and Electrical Engineering*; Greta Gray, *Head Department of Home Economics*.

## List of Delegates in Attendance

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ALABAMA: L. N. Duncan, W. O. Winston.  
ARIZONA: D. W. Working, W. M. Cook.  
ARKANSAS: J. C. Futrall, B. Knapp, M. Nelson, W. N. Gladson, M. T. Payne, Stella Palmer.  
CALIFORNIA: H. E. Van Norman.  
COLORADO: C. A. Lory, C. P. Gillette, A. A. Edwards, A. E. Lovett.  
CONNECTICUT: C. L. Beach, H. J. Baker, A. T. Brundage, M. Estella Sprague.  
DELAWARE: C. A. McCue.  
FLORIDA: P. H. Rolfs, C. K. McQuarrie, Sarah W. Partridge.  
GEORGIA: A. M. Soule, J. P. Campbell, Mary E. Creswell.  
IDAHO: A. H. Upham, E. J. Iddings, L. W. Fluharty.  
ILLINOIS: E. Davenport, C. R. Richards, W. F. Handschin, W. L. Burlison, Juliet L. Bane.  
INDIANA: W. E. Stone, G. I. Christie, A. A. Potter, J. H. Skinner.  
IOWA: R. A. Pearson, A. Marston, R. K. Bliss, W. H. Stevenson, Catharine J. MacKay, Neale S. Knowles.  
KANSAS: W. M. Jardine, F. D. Farrell, R. A. Seaton, H. Umberger, Helen B. Thompson.  
KENTUCKY: T. P. Cooper, G. Roberts, T. R. Bryant, F. P. Anderson, Mary E. Sweeny.  
LOUISIANA: W. R. Perkins.  
MAINE: R. J. Aley, C. D. Woods, H. S. Boardman.  
MARYLAND: A. F. Woods, T. B. Symons, H. J. Patterson, A. N. Johnson, H. F. Cotterman, F. B. Bomberger.  
MASSACHUSETTS: K. L. Butterfield, E. M. Lewis, S. B. Haskell, F. W. Morse, J. D. Willard, R. W. Redman, H. W. Tyler, J. M. DeBell.  
MICHIGAN: R. S. Shaw, R. J. Baldwin, G. W. Bissell, E. E. Gallup.  
MINNESOTA: L. D. Coffman, R. W. Thatcher, E. M. Freeman, A. D. Wilson, Mildred Weigley.  
MISSISSIPPI: J. R. Ricks, R. S. Wilson, Susie V. Powell, M. M. Bedenbaugh.  
MISSOURI: F. B. Mumford, M. F. Miller.  
MONTANA: E. B. Norris, F. S. Cooley.  
NEBRASKA: S. Avery, E. A. Burnett, O. J. Ferguson, Margaret Fedde, W. H. Brokaw.  
NEVADA: W. E. Clark, R. Stewart.  
NEW HAMPSHIRE: R. D. Hetzel, J. C. Kendall, F. W. Taylor, C. H. Crouch, C. B. Wadleigh, E. P. Robinson, Daisy D. Williamson, Helen McLaughlin.  
NEW JERSEY: W. H. S. Demarest, J. G. Lipman, L. A. Clinton.  
NEW MEXICO: R. W. Clothier, F. Garcia, C. F. Monroe.  
NEW YORK: A. R. Mann, M. C. Burritt, D. S. Kimball, W. H. Chandler, C. Betten, Martha Van Rensselaer, Ruby G. Smith, M. Robinson, U. P. Hedrick.

- NORTH CAROLINA: W. C. Riddick, B. W. Kilgore, C. C. Taylor.
- NORTH DAKOTA: P. F. Trowbridge, G. W. Randlett, E. S. Keene, J. H. Shepperd.
- OHIO: A. Vivian, E. A. Hitchcock, O. M. Johnson, Faith R. Lanman, C. G. Williams, H. C. Ramsower.
- OKLAHOMA: H. G. Knight, J. A. Wilson.
- OREGON: W. J. Kerr.
- PENNSYLVANIA: R. L. Watts, M. S. McDowell, R. L. Sackett, Edith P. Chace.
- RHODE ISLAND: H. Edwards, B. L. Hartwell, A. E. Stene, G. E. Adams, R. L. Wales.
- SOUTH CAROLINA: W. M. Riggs, H. W. Barre, F. H. H. Calhoun.
- SOUTH DAKOTA: W. E. Johnson, C. Larsen.
- TENNESSEE: H. A. Morgan, C. A. Mooers, C. A. Keffer, N. E. Fitzgerald, C. E. Brehm.
- TEXAS: W. B. Bizzell, W. B. Lanham.
- UTAH: F. S. Harris, R. J. Evans.
- VERMONT: J. L. Hills, T. Bradlee, J. W. Votey, Bertha M. Terrill, Charlotte C. Pierpont.
- VIRGINIA: J. A. Burruss, J. R. Hutcheson.
- WASHINGTON: E. C. Johnson, H. V. Carpenter.
- WEST VIRGINIA: F. B. Trotter, J. L. Coulter, N. T. Frame, C. R. Jones, W. H. Kendrick.
- WISCONSIN: K. L. Hatch, Abby L. Marlatt, F. E. Turneure, F. B. Morrison, Nellie K. Jones.
- WYOMING: A. Nelson, A. D. Faville, A. E. Bowman.

# Constitution

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## NAME

This Association shall be called the Association of Land-Grant Colleges.

## OBJECT

The object of this Association shall be the consideration and discussion of all questions pertaining to the successful progress and administration of the institutions included in the Association, and to secure to that end mutual cooperation.

## MEMBERSHIP

(1) Every college established under the Act of Congress approved July 2, 1862, or receiving the benefits of the Act of Congress approved August 30, 1890, shall be eligible to membership in this Association, provided that any agricultural experiment station not now connected with one of the above named colleges, but receiving the benefits of the Act of Congress approved March 2, 1887, shall also be eligible to membership.

(2) Any institution a member of this Association in full standing may send any number of delegates to the annual convention of the Association.

(3) Delegates from other institutions engaged in educational or experimental work in the interest of agriculture or mechanic arts may, by a majority vote, be admitted to conventions of the Association with all privileges except the right to vote.

(4) In like manner, any person engaged or directly interested in agriculture or mechanic arts who shall attend any convention of this Association may be admitted to similar privileges.

## SECTIONS

(1) The executive body of the Association shall consist of the presidents or executive officers of the institutions having membership in the Association. The executive body shall be the legislative branch of the Association.

(2) Sections shall consist of the following: A section of agriculture; a section of engineering; a section of home economics; and such other sections as may from time to time be approved by the executive body.

The sections shall communicate their recommendations and reports to the general session which shall in turn report to the executive body.

The membership of the sections shall consist respectively of the directors, deans, or other administrative heads of these respective departments or divisions of the institutions having membership in the Association and of similar divisions of the United States Department of Agriculture and the Federal Bureau of Education.



**MEETINGS**

(1) This Association shall hold at least one meeting in every calendar year, to be designated as the annual convention of the Association. Special meetings may be held at other times, upon the call of the Executive Committee, for purposes to be specified in the call.

(2) The annual convention of the Association shall comprise one or more meetings of the executive body to which shall be referred all business of the convention requiring legislative action.

Meetings of the sections for the discussion of matters pertaining to their respective lines of work shall be provided for in the convention program.

General meetings of the convention shall be held as designated by the Executive Committee.

**OFFICERS**

(1) The officers of the Association shall consist of a president, vice-president, and secretary-treasurer, to be chosen by the executive body.

(2) Each section shall elect its chairman and secretary.

(3) An executive committee of five members shall be chosen by the executive body, of which committee three members shall be chosen from the executive body and the remainder at large.

**DUTIES OF OFFICERS**

(1) The officers of the Association shall perform the duties which usually devolve upon their respective offices.

(2) The president shall deliver an address at the annual convention before the Association in general session.

(3) The Executive Committee shall determine the time and place of the annual conventions and other meetings of the Association, and shall, between such conventions and meetings, act for the Association in all matters of business. It shall issue its call for the annual conventions of the Association not less than sixty days before the date on which they are to be held, and for special meetings not less than ten days before such date. It shall be charged with the general arrangement and conduct of all meetings called by it. It shall designate the time and place of the convention. It shall present a well-prepared order of business, of subjects for discussion, and shall provide and arrange for the meetings of the several sections. The subjects provided for consideration by each section at any convention of the Association shall concentrate the deliberations of the sections upon not more than two lines of discussion, which lines, as far as possible, shall be related. Not more than one-third of the working time of any annual convention of the Association shall be confined to miscellaneous business.

**FINANCES**

At every annual convention the Association shall provide for obtaining the funds necessary for its legitimate expenses, and may, by appropriate action, call for contributions upon the several institutions eligible to membership; and no institution shall be entitled to representation or participation in the benefits of the Association unless such institution shall have

made the designated contribution for the year previous to that in and for which such question of privilege shall arise, or shall have said payment remitted by the unanimous vote of the Executive Committee.

#### AMENDMENTS

This constitution may be amended at any regular convention of the Association by a two-thirds vote of the executive body, if the number present constitute a quorum of the membership; *Provided*, that notice of any proposed amendment, together with the full text thereof and the name of the mover, shall have been given at the next preceding annual convention and repeated in the call for the convention. Every such proposition of amendment shall be subject to modification or amendment in the same manner as other propositions, and the final vote on the adoption or rejection shall be taken by yeas and nays of the institutions then and there represented.

#### RULES OF ORDER

(1) The Executive Committee shall be charged with the order of business, subject to special action of the Association, and this committee may report at any time.

(2) All business or topics proposed for discussion and all resolutions submitted for consideration of the Association shall be read and then referred, without debate, to the Executive Committee, to be assigned positions on the program.

(3) Speakers invited to open discussion shall be entitled to twenty minutes each.

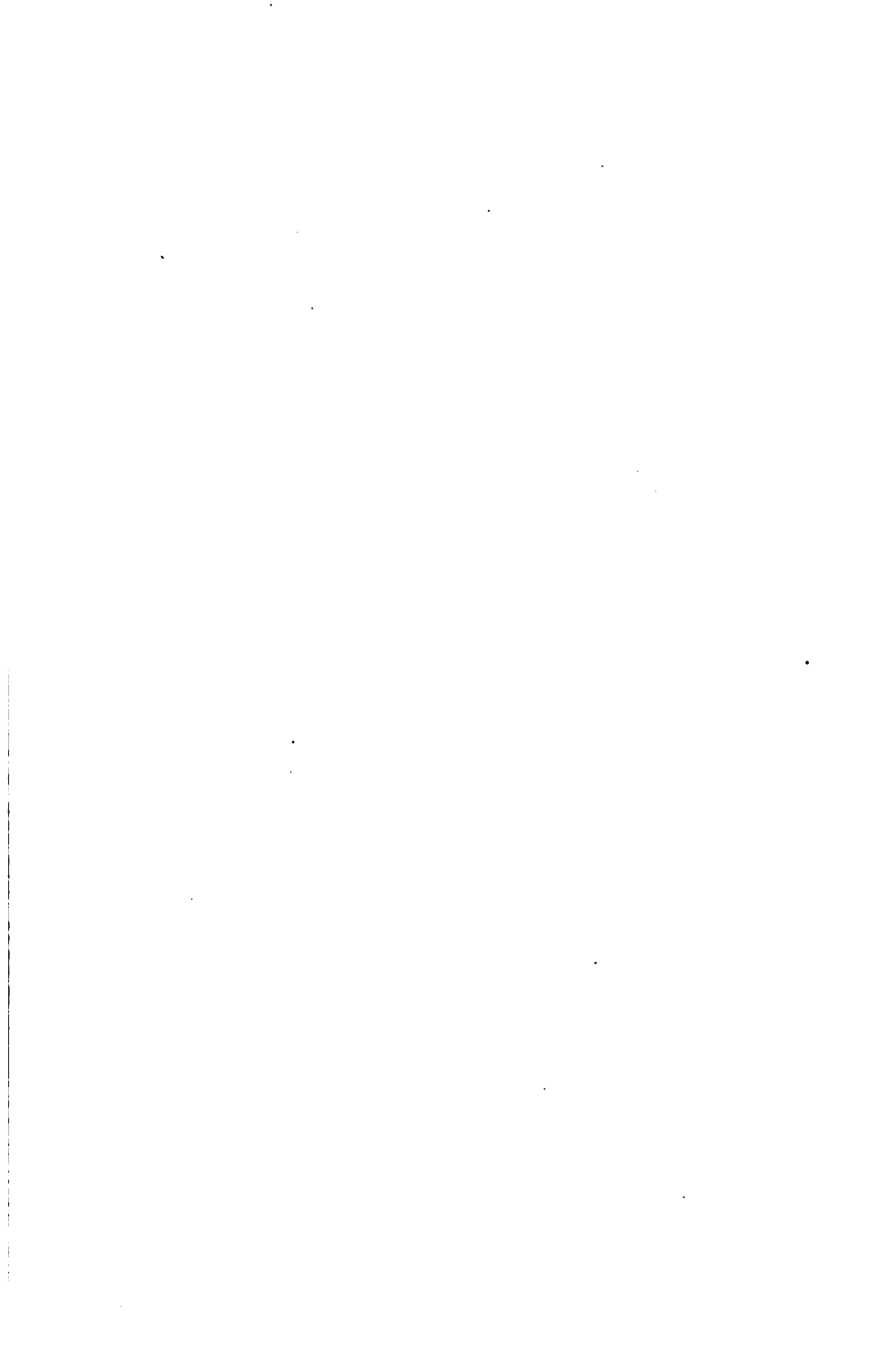
(4) In general discussions the ten-minute rule shall be enforced.

(5) No speaker shall be recognized a second time on any one subject while any delegate who has not spoken desires to do so.

(6) The hours of meeting and adjournment adopted with the general program shall be closely observed, unless changed by a two-thirds vote of the delegates present.

(7) The presiding officer shall enforce the parliamentary rules usual in such assemblies and not inconsistent with the foregoing.

(8) Vacancies which may arise in the membership of standing committees by death, resignation, or separation from the Association of members shall be filled by the committees respectively.



# **Proceedings of the Thirty-Fourth Annual Convention of the Association of Land-Grant Colleges**

## **MINUTES OF THE GENERAL SESSIONS**

**TUESDAY EVENING, OCTOBER 19, 1920**

The convention was called to order at 8.15 P. M. by the vice-president, President R. J. Aleý of the University of Maine.

Prayer was offered by President W. H. S. Demarest of New Jersey.

The first order of business was the report of the Executive Committee, which was given by the chairman, President R. A. Pearson of Iowa State College.

### **REPORT OF THE EXECUTIVE COMMITTEE**

R. A. PEARSON. I wish to call your attention to two bulletins which have been issued following meetings of the Executive Committee, one in February and one in July. Full statements of the transactions of those meetings are given in the bulletins, so it will not be necessary to report the items at this time.

Hampton Institute, which has been a loyal supporting member of this organization for 30 years or more, does not now draw funds under the Land-Grant Act. The Institute has made application to be continued in regular membership, but that is not possible. The Executive Committee feels that an invitation should be extended, however, to the president of Hampton Institute stating that its representatives will be welcome at meetings of the association as visitors.

You know of the studies that are being made by our Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts. Some of you will be interested to learn that the United States Bureau of Education has appointed a committee to study methods of teaching agriculture, and that its preliminary report (Higher Education Circular 31) was issued last July.

The Executive Committee has received many communications with reference to the publication of the Journal of Agricultural Research. The matter was taken up with Senator Smoot of Utah, Chairman of the Joint Committee on Printing. It appears that this journal is on the same footing as other periodical publications, and that their continuance after the close of the fiscal year depends upon Congressional action. The advisability of adopting resolutions touching this matter is suggested.

The Executive Committee today held a conference with representatives of the Federal Board for Vocational Education and discussed in detail a number of matters which are of interest in some of our institutions.

A report has come to us that the officers of the American Farm Bureau Federation, having learned that efforts are being made to divert the

Smith-Lever and the Smith-Hughes funds into hands other than those wherein they now are lodged, has written an emphatic letter protesting against such efforts. The American Farm Bureau Federation has deep interest in the work which is being carried on under both of these enactments.

Those of you who have not already learned of the fact will be interested to know that Dean T. F. Hunt of the University of California has been appointed to succeed the late David Lubin as American delegate to the International Institute of Agriculture at Rome during his sabbatical leave.

The Executive Committee has reappointed President A. F. Woods of the University of Maryland as representative of this association with the National Research Council.

**THE VICE-PRESIDENT.** The next matter of business is the report of the treasurer.

#### REPORT OF THE TREASURER

November 12, 1919 to October 19, 1920

##### RECEIPTS

To balance on hand, Chicago meeting .....	\$ 471.67
To 45 dues at \$75 .....	3,375.00
To 2 dues at \$55 .....	110.00
To 3 dues at \$35 .....	105.00
To 4 dues at \$20 .....	80.00
To dues for 1918-19 (University of Arizona) .....	35.00
Total receipts .....	\$4,176.67
Disbursements as per statement .....	3,752.34
Balance on hand October 19, 1920 .....	\$ 424.33

##### DISBURSEMENTS

Executive committee .....	\$1,097.30
Extension committee .....	52.11
Secretary-treasurer's office .....	101.02
American Council of Education dues .....	200.00
Honorarium, Dr. J. R. Angell .....	50.00
Proceedings thirty-third convention (printing, stenographic service, editing, postage, etc., programs thirty-fourth convention) .....	1,751.91
Certificate of deposit .....	500.00
	\$3,752.34

##### ASSETS

Cash on hand, October 19, 1920 .....	\$ 424.33
Certificates of deposit (September 9, 1919 and July 1, 1920) .....	1,000.00
Seventeen months interest on \$500 at 4 percent .....	28.33
Liberty Bonds (third issue) par value .....	2,000.00
(All coupons attached—matured to date) .....	199.80
Total assets .....	\$3,652.46

## REPORT OF THE AUDITING COMMITTEE

The auditing committee has examined the accounts of the treasurer and finds the same to be correct. All vouchers properly approved and receipted have been found on file. It also finds a bank balance as stated of \$424.33, and finds in the treasurer's hands two (2) Liberty Bonds of the third issue for one thousand dollars (\$1,000) each, numbers 496,153 and 496,154, with all coupons attached, bearing interest at the rate of 4½ percent per annum, and two certificates of deposit 279 and 293 of the City Trust Company, Burlington, Vermont, dated September 9, 1919, and July 1, 1920, bearing simple interest at the rate of 4 percent per annum.

W. B. BIZZELL,

F. B. MUMFORD,

*Auditing Committee.*

THE VICE-PRESIDENT. I have the pleasure of introducing the President of the Association of Land-Grant Colleges, Chancellor Samuel Avery of the University of Nebraska.

## PRESIDENTIAL ADDRESS

## OUR PRESENT COLLEGE PROBLEMS

BY SAMUEL AVERY

This meeting of the Association of Land-Grant Colleges is held under unusually happy auspices. No patriotic American fails to recognize the enormous debt that we all owe to the State of Massachusetts. This is the year of the tercentenary of the landing of the Pilgrims and the signing of the Mayflower compact universally regarded as the first written constitution of a democratic State. We have assembled in this city that we may participate a little later in the anniversary exercises of the agricultural college of the State. To me it is an especially agreeable task to deliver the formal presidential address before this great association in the valley of the State from which my ancestors came. With the historic background of three hundred years of State and institutional development the group whom I am now addressing will, I think, feel disposed to make a brief scrutiny of the past and resolutely face the perplexities of the present time. I trust that as the result of our deliberations we may when the session is concluded go to our homes with renewed courage and optimism.

I need not recount how the land-grant colleges sprang from the thoughts of those who amid the strife and turmoil of the Civil War foresaw "the better good they would make" in the years to come. I need not relate the oft-repeated story of the movement to establish schools for the benefit of "the agricultural and industrial classes" and how these efforts resulted in legislation for the "maintenance in each State of at least one college where the leading object shall be \* \* \* \* to teach such branches of learning as relate to agriculture and the mechanic arts \* \* \* \* in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life". Superfluous too would it be in such a group as this to refer to the early struggles in building up a new system of education for which no models existed except the fine, though inadequate, colleges of the past. Nor need I recall the

enormous amount of time, patience, and toil expended in developing into sciences worthy of the name the studies connected with "agriculture and mechanic arts". All of these are in the consciousness of everyone present. I refer to them only because in the perplexities of the present we may lose sight of the historic past and forget in the struggles of the hour the achievements of bygone years.

The members of this association who bear the responsibility of leadership in the land-grant colleges can now see perhaps more clearly than was possible during the passionate patriotism of the World War or during the turmoil of readjustment, the part that our institutions should play in human affairs. A good many of the thoughts we cherished and the words we uttered not long ago now seem either platitudinous or quixotic. In making this statement I would not be thought to be lacking in appreciation of the inspiring and prophetic addresses that we heard during the late war or the words of wisdom uttered since November 11, 1918. I merely wish to emphasize the fact that I think the present is a peculiarly fitting time for scrutinizing the immediate needs of our institution and making a survey of some of the things that we may do in the service of our country. A half century of growth and development has made us strong for the tasks at hand. On the occasion of this anniversary I may recall with pride to your minds that in these fifty odd years there have been developed approximately fifty well-equipped land-grant institutions; that these institutions contain approximately 10,000 professors, investigators, and resident extension men who may be considered of permanent professorial rank; that even before the war the property of these institutions aggregated over one hundred and thirteen million dollars; that the annual budgets were not far from thirty-two million dollars; and that the number of students in residence totaled 86,000 and the number touched outside of those in residence, of course, many more. Such an organized group working together cannot fail to influence profoundly the thought and feeling of those people whom they were chiefly designed to serve. Bound together as we are by the fact of a common origin, inspired as we are by similar ideals, this organization is undoubtedly the strongest group of institutions of collegiate rank in the world, and in so far as higher education is applied directly to agriculture we have practically an exclusive field. The influence, then, that this association may be able to exert in the future is exceedingly great.

No group can exert a control even approaching completeness over human thought and human tendencies, but an organized group may be able to modify human thought, passions and impulses. We could not stem, if we desired, the currents of the thoughts of our age. We can by education influence our constituency so as to direct definitely the current of its thoughts. Mankind cannot stem the course of rivers, modify climate, or prevent the rain falling on the mountains from reaching the sea, but it is perfectly possible to divert and direct the course of rivers so that they may minister to the welfare of mankind. For instance, our colleges could not if they wished at the present moment confine their attention to production and ignore the fact that the world is intensely interested in distribution, marketing and accounting. In serving the agricultural and industrial classes we may do much to convert what threatens

to become an erosive stream of personal and class selfishness into a gentle irrigation current of public welfare or at least of rational self-interest.

Equipped with such material and intellectual strength, a special service that the land-grant colleges can now render is to assist in the sane, economic and social transition from the ideas of the past to the future organization of society, a transition inevitable as the result of the war and the increasing class consciousness. The land-grant colleges have always been peculiarly fitted to perform this service. One may hear in the atmosphere of some of the older educational establishments academic croakings about the newer state of affairs, bitter lamentations over the blighting effects of the new amendments to the Constitution of the United States. Did not a professor of psychology in a great university not long ago think that the suppression of alcohol would result in the repression of all poetic thought and sentiment and lead ultimately to atrocious social crimes? Did we not hear from the conservatives in other college circles occasionally expressions of fear for the blighting effect of the nineteenth amendment with applause for Tennessee or Connecticut endeavoring for a time to play the part of Horatius at the bridge? This reactionary conservatism is almost never met in genuine land-grant college circles; at most we find it growing like weeds in some neglected corner of our land-grant farms. On the other hand, since one extreme always begets another, we do not find in typical land-grant colleges the parlor red, the academic bolshevist and economic "nut" such as to some extent infest other schools. Freed from the danger of both extremes, the workers in land-grant colleges are peculiarly fitted by antecedents and by temperament to assist wisely in bringing in the new era, an era in which the world thought will be more profoundly than ever influenced by the contributions, to use the words of Senator Morrill, of "the agricultural and industrial classes".

No part of the work of the land-grant colleges has been of more far-reaching importance than that of the experiment stations. The former title of our association, the Association of American Agricultural Colleges and Experiment Stations, recognized the tremendous importance of this phase of the work. It is universally admitted that until the scientific work of the experiment stations and the work of the Department of Agriculture at Washington had developed and collected a body of agricultural knowledge worthy to be termed a science or a group of sciences, there was little distinctive in the land-grant colleges worth teaching. There was in the early days of our colleges little that could be done in the way of agricultural extension because there was little to extend. The work in extension came about naturally as the result of the feeling of agricultural leaders in the country that a great body of knowledge had been collected, much of which was unknown and unappreciated by the people most vitally interested. The advancement of the work in extension has been of the utmost importance and I would not in any way belittle it, but its progress has of necessity to some extent been made both absolutely and relatively at the expense of the older and more fundamental phases of our work. The demands of the war period aggravated the condition into which we were already drifting. The young men trained in agriculture were called at hitherto unheard of salaries and without broad experience into college extension, State, and Federal service. The demands of the military service also depleted the ranks of station



workers; the relatively static condition of salaries in the experiment stations had lessened the esteem in which these positions are held by the young men of the country. Instead of a return to normal conditions we find ourselves now in a situation even worse. This is, of course, due largely to the temper of the time and to the economic conditions of the country, but explain it as we may, we must face the fact that experiment station work is languishing. If it is the functions of the station worker to create and of the other departments of the college to "sell" its products, are we not likely to find ourselves soon with nothing new to sell and our constituency well stocked with the old ideas? If this condition is not remedied I feel that we are drifting toward sterile times in thought and progress. Shall the achievements of classical investigators in agriculture have ceased with our entering the World War? The time has passed when a brilliant graduate will accept a fellowship in connection with experiment station work and continue his studies on a stipend of \$300 or \$400 per year with the prospects of a higher degree and an instructorship at \$1,900 at the end. In times when there are numerous instances of illiterate day laborers earning over \$2,000 a year the youth of our country will not, cannot, continue to man our experiment stations on the old stipends. If present economic conditions are to continue, and in spite of some downward trend in prices I see no possibility of any radical change in the near future, the younger rising men will have to receive three times the salary and the older mature scientists twice the pre-war salaries if we are to draw them into or hold them in station work. Further, there should be special rewards devised for those who are unusually brilliant and successful. Only by a radical change in our system can we hope to maintain that degree of efficiency in the work of investigation which till recently was the glory and pride of our colleges.

The colleges in general and the experiment stations in particular are very much in the position of a family with only a moderately increasing income and greatly growing demands. These demands come from the fact that while the founders of the land-grant institutions were wise they were not omniscient. As you know, approximately a quarter of a century elapsed between the original Morrill Act and the first great supplementary act, the Hatch Act. It is evident from the early debates, petitions, legislation and other historical sources, that the founders of the land-grant colleges had two thoughts in mind—the general education of the industrial classes and the diffusion of knowledge relating to production. It soon became evident that there was little of such knowledge to diffuse, hence the experiment stations were founded. Production is more important with our increasing population than it was a quarter of a century ago, but we now realize very keenly the need of a broad extension in the economics of agriculture, knowledge of labor conditions, transportation, co-operative methods, rural sociology, taxation, and many other things are urged upon us. We are called upon to do work for which we have partly inadequate intellectual and totally inadequate financial support.

In the above I have not referred to the enormous needs of the public for engineering information which can be obtained only from experimentation. The efforts to find a satisfactory basis for federal aid in this respect are familiar to everyone. A few of our colleges have started engineering laboratories. Agricultural engineering has received deserved

recognition in my own State. Exhaustive testing of tractors is now in progress at an expense greater to the State than the annual subsidy for the experiment station provided in the Hatch Act, and yet this is perhaps in the twilight zone between inspection and investigation. The point I wish to emphasize particularly is that we need, to fulfill our mission, not only vastly increased resources along the lines directly stimulated by the Hatch Act and the supplementary acts and amendments but also we need the work of the investigator in many lines, in economics, in rural organization, in transportation, in business matters, in home economics, and in many other things too numerous to mention. In view of the constantly increasing demands, the constantly diminishing purchasing power of the dollar, I venture further to raise the question whether in addition to greatly supplemented revenues it would not be possible to have a closer cooperation between the several colleges and the Department of Agriculture in order to avoid duplication of effort and to conduct at only a relatively few places those particular investigations that are applicable to the country at large. I would not suggest, of course, too close an organization of research. The men of inspiration must not be hampered and each college must be reasonably free to work out its own destiny. Nevertheless there is an opportunity, in view of the demands made upon us, for a wise distribution among the several stations of some of the problems confronting us rather than that all should try to do everything in an inadequate way.

No one could have imagined a few years ago how soon the map of the world would be radically changed. Equally difficult would it have been to have formed any conception of the new organizations that would spring up and of the regrouping of social forces. Who would have thought that working men's autocracies would have been established in Russia? Who could have guessed the medley of new organizations, new governments, new states, and states within states that have sprung up in central Europe? In America too, the most prosperous, the most enlightened, and in some respects now the most conservative country in the world, have occurred remarkable efforts of organization which promise or threaten according as you view them to effect a radical change in our national life. It needs no prophet to foresee that the farmers of our country will continue their work of organization and that the older and newer societies, leagues and bureaus, social, educational, cooperative, and political will continue to flourish and be an important factor in our national life. From now on it will be the peculiar privilege and duty of the land-grant colleges to train the leaders of these movements and to secure through investigation the knowledge necessary for wise thought and action. At this point I wish to quote from memory a significant utterance of Lord Bryce. Referring to the newer movements of the times the world over he said, "The universities must serve the public but never cater to the public". We could not if we would dominate and direct these movements, but we can keep in sympathetic touch with them. We can train the young men who are to lead in them during the future. We can see that they are equipped with knowledge from the historic past as well with technical skill and present day information. It is the duty of our land-grant colleges to inculcate in their students more and more a spirit of reasonable altruism and a broad conception of the place the constituents of these colleges

are to fill in the nation and in the world. For the young men from our colleges will be not only the natural leaders of these various agricultural and economic movements in which the "agricultural and industrial classes" participate, but they will as naturally participate more and more in state, national and world politics. A young man to whom a few years ago I handed a certificate of graduation from the School of Agriculture of the University of Nebraska is now the prime minister of a republic created out of one of the provinces of the old Russian empire. Doubtless all of the institutions could mention similar instances where young people exposed to the influence of the college, I use the term "exposed" advisedly, have entered upon careers of commanding influence and where the college had at least presumably an opportunity to influence profoundly human affairs.

Our civilization is now like a ship on an uncharted sea but we are not without the stars of experience to guide us. Those who think that an entirely new civilization is to appear and those who hope to return to past conditions are equally mistaken. More than once have economic conditions after a great world war had certain phases in common with those as we see about us. After the defeat of the Spanish Armada, England suffered as we are suffering from too much prosperity. Cows sold for two pounds each instead of one pound. The babies of London died because people could not earn enough to purchase milk for them. Farmers on the other hand found that agricultural laborers demanded so much that farming was unprofitable. The middle-men doubled their profits, but they in turn found prices so enhanced that most of them were enabled to live in no greater comfort than previously. Yet England was able to readjust its economic conditions and the standard of living in the main was higher than before and the upward trend has continued with few interruptions ever since. If the land-grant colleges through teaching and research become, as I believe they will, an important factor in our economic readjustment, who can estimate their value to the country and the world? If in the uncertain days to come we improve our opportunity of training wise leaders and teach to those who are led control of temper and breadth of vision so that the difficulties of readjustment are met more peacefully and with greater justice than ever followed a similar world war, shall we not render in this way a service even greater than any of the achievements of the past fifty years?

I am, of course, aware that the above is platitudinous and that every one of my hearers has some burning sense of wrong towards the present economic conditions as affecting both him personally and the group with which he associates. One is constantly under temptation to violate the injunction expressed by a writer in a prominent magazine, "Better be dull and decent than to start something". Yet I hope it will not be considered a violation of this injunction if I endeavor to voice the sentiment which I imagine everyone feels, that one of the outstanding duties of our colleges at the present time is to do what they can for the salvation of the middle class. Through all recorded history, philosophers and poets have lamented the folly and extravagance of the rich and the unwholesome greed, clamor, and idleness of the poor. Our Nation is still in the period when the middle class must "serve the State" and defend "the people's laws". Whatever movements then are inaugurated to serve this class now

sorely oppressed by forces which we may term capitalism on the one hand and wage labor on the other, is a movement not merely to the end that those now in it may live under tolerable conditions, but that the type of people who through all history have been the most wisely conservative and at the same time most sanely progressive can continue to labor in the future as they have in the past. The first duty nearest at home is to make tolerable the life of professors, the investigator, and the administrator in our own colleges. I trust this will not be taken as a selfish attitude and I hope I may not be perverting the Scriptures when I quote, "But if any provide not for his own, he hath denied the faith, and is worse than an infidel".

In consideration of how the land-grant colleges can best serve the country and the world in the perplexing, but I fully believe, glorious years that are to come, we may fairly take into consideration two contrary thoughts in regard to educational policies. There are those who insist that the chief failure of our colleges is the inability to develop intellectual leaders, and who see in the growth of our institutions schools that "are devoted in the name of democracy to standards of mediocrity in scholarship". Personally I am one of those who believe that the country and the world are to find salvation through the numbers participating in education, particularly in the type of education that the land-grant colleges offer. Training for leadership is of the utmost importance, but we must train not only generals but colonels, majors, captains, lieutenants, sergeants, corporals, and even privates as well. An army like Xenophon's ten thousand can select its own leaders and select them intelligently, while a Persian horde disappears when Cyrus falls. Before entering the great war Russia had produced quite as high a type of scholar, thinker, philosopher, engineer, lawyer, and economist as America. Generals were not lacking, yet little had been done for the democracy of scholarship which some of our educational leaders now affect to despise. The amazing result of the participation of America in the World War is to a very large degree traceable to the broadness of our education and to the enormous numbers that had come under its influence. If the world is to be saved from the odious tyranny of Prussian junkers or of Russian bolshevists, the result must be effected by continuing and increasing in a very large way the combination of liberal and technical education for the benefit of, to use the words of Senator Morrill, "the agricultural and industrial classes". They must participate in this education in constantly increasing numbers, cost the public what it may!

As I said in the beginning of this address the achievements of the past should give us confidence for the future. The land-grant colleges during their more than fifty years of existence have done much to establish the science of agriculture and have trained nearly all the leaders of scientific workers in this field. The carrying out of the provision for military instruction as provided by the original Morrill and subsequent acts diffused throughout the country a rudimentary knowledge of military affairs which was of enormous value to the country at large, a fact recognized by no less an authority than General Pershing. The contributions of the land-grant colleges to the knowledge of engineering have been important and have resulted in not a little of the industrial development of the country. In the diffusion of learning the land-grant colleges reached

a new constituency. . Further than that they have elevated and dignified a knowledge of the practical. Through their influence a perfect ear of corn has become an object of admiration comparable to that of a Greek statue. The vitalizing influence of these colleges has been felt throughout the length and breadth of the land. With this record and with this history have not our peculiar institutions the strength with their numerous alumni, their faculty, and their material equipment, to do a still greater work in the future? Have they not come into the kingdom for such a time as this? If, as I believe, the thoughts of the peoples of the world are turning from extreme nationalism and militant patriotism to a consideration of their social and economic problems, may not the help of the land-grant colleges be peculiarly needed in the efforts now put forth to secure peace and contentment at home with honor abroad? In these perplexing times have not our colleges, founded for the education of the "agricultural and industrial classes" a peculiar mission to perform and a peculiar opportunity for service?

THE PRESIDENT. Dean W. W. Charters of the Carnegie Institute of Technology will now address us.

#### IMPROVEMENT OF COLLEGE TRAINING

BY W. W. CHARTERS

There has been a serious conflict waging between the teachers of the pure sciences and those of the technical subjects in all professional schools for the last decade. The instructors in the fundamental sciences have a tendency to give the same subject matter to all students, whether they are expecting to be doctors, engineers, or farmers, and they are loath to make changes in the content of their subjects for particular bodies of students. On the other hand the instructors in the professional courses have a tendency to feel that much concerning the fundamental sciences is taught which has no direct bearing and but a negligible amount of indirect value for vocational practice or theory.

The supporters of the position that the fundamental sciences should be taught to all students alike reason somewhat as follows:

It is claimed that the fundamental sciences provide a résumé of the whole field and that it is the business of students and the teachers of the applied sciences to select out of the field such items as they may need in their particular vocations. There is something to be said in favor of this position but there are two or three considerations to be urged against it. In the first place, it is clear that these fundamental sciences themselves, while they possess very great value, are not in any sense based upon a metaphysical substructure of matter which remains permanently changeless. There is no fundamental principle of chemistry or botany, for instance, which may not be subject to change, for principles are the product of the human mind working upon matter and are not inherent in matter itself.

This is quite clearly illustrated in the history of botany. Prior to 1860 the field of systematic botany consisted almost entirely of the classification of plants. Since the evolutionary theory became known, the botanist transferred his interest from the classification of plants to the evolution of plant forms. At one time, fifteen years ago, the systematic text-books on botany

dealt with the anatomy of plants. More recently they have dealt with the physiology of plants, and what the next change will be, I do not know; but we can be sure that there will be a change. Since botany and the other fundamental sciences are changed from time to time it follows that there is nothing sacred about what appears in the text-books at any one time, and it is easily possible that modifications should be widely made to meet the necessities of the applied sciences, as well as those of the specialists themselves. In the second place, there are many problems in the applied fields for which the fundamental sciences have worked out no solutions and, therefore, the science has little to say which is of value upon these points. For instance, in psychology the scientific work has been done largely upon the intellect and instincts; but in the field of applied psychology we find that the emotions, leadership, morale, etc., are of more importance than the intellectual problems. Consequently, the psychologist who is interested in these direct applications cannot remain satisfied with the old fundamental courses in pure psychology. Similarly, in agriculture, the fundamental sciences must be modified in order to handle the problems of agronomy, horticulture, etc.

It has been claimed that the one great value of the fundamental sciences lies in the mental discipline derived from their study, but it is becoming more and more evident that the mental discipline obtained in one study does not carry over into other fields to any great extent, and that, in itself, this is not a sufficient reason for the teaching of the fundamental subject. Even though it is claimed that the thinking in the applied sciences is loose as compared to the fundamental sciences, it is doubtful whether it is necessary to have greater exactness of thinking than is necessary in the work which an individual is to carry on in the applied field. As the demand for greater exactness grows in the applied field, the technic of that field will grow increasingly exact.

While I have just been indicating the fact that the fundamental sciences do give a résumé, or bird's-eye view, of the whole field, but that the field so summarized might have its items selected upon the basis of the usefulness which they possess for the vocation which is being studied, undoubtedly the fundamental sciences are of great value and are particularly useful in the vocations because they explain the reasons for vocational practices. My only contention is that the items chosen should be selected for their usefulness and that other items may be rejected from the course.

In making this statement it is understood that when the items which are to be applied are determined it will then be necessary to provide sufficient connective tissue within the subject for all the items to be seen in their proper relations. That is to say, the course would need to include not only the principles used but that additional information which is necessary in order to understand the principles.

To base a curriculum upon job analysis of the duties to be performed in the vocation requires three or four steps. In the first place, an analysis is made of the duties which are necessary in the carrying on of the vocation, and in connection with this a decision is made as to those which can best be learned on the job as over against those for which training is necessary. When these topics have been determined the second step emerges. This consists of the collection of the processes which are necessary for the performance of the duties.

In college teaching a third step is necessary. Not only is it necessary to show the methods by which the duties are performed, but it is incumbent upon the instructors to show why these processes are conducted in the form in which they appear. Obviously this leads one at once to the fundamental sciences which provide the principles which either consciously or unconsciously underlie the practices of the vocation.

It is apparent in such a case that the items in the fundamental science which is used in one vocation might be quite different from those used in another vocation.

A sufficient number of studies of this sort have been carried on to demonstrate the feasibility of deriving the fundamental sciences in this manner. I might call particular attention to the study which is being made by Mr. Strong at the Carnegie Institute of Technology, in which the curriculum in commercial engineering was determined by the following processes: A job analysis was made of the duties of executives, from foremen up, from some 40 business concerns in the community of Pittsburgh, and the material so obtained was classified into courses. From this material were derived the items of the fundamental science needed in the study of these courses and the whole was thrown together into thoroughly practical form as the content of the courses in commercial engineering.

Such a plan can be followed with quite complete success, I am certain, in the field of agriculture. It is entirely feasible to make a job analysis of types of farming in a given section of the country, and with the duties of the type of farming in mind, to collect the methods necessary to carry on these duties. Then from these can be determined the content of the fundamental sciences necessary for an understanding of these processes. It is perfectly clear to me from my own connection with this field of curriculum construction for a number of years, that the project is entirely practicable and would not be particularly expensive.

When such a course has been determined by this objective method, we shall know just how much time should be given to one subject or to another, and what the content of each subject should be. If agricultural colleges were business concerns, such a study would be made as a matter of course, because the results could be measured in dollars and cents, but it is somewhat difficult to sell the idea to college administrators and boards of trustees, because the product of the efforts of instructors in colleges is so intangible that it is not easily to be measured. But the product is so immensely valuable that the waste of time arising from the failure to definitely determine and analyze objectives is almost criminal in its seriousness. I, therefore, know of nothing of more importance for the associations before whom I speak than the pressing of a demand for the reorganization of the curricula of agricultural colleges based upon the scientific analysis of the duties to be performed in the vocation which its graduates will follow.

THE PRESIDENT. I am sure that I voice the feeling of everyone present when I say that we are greatly indebted to Dean Charters for his valued address.

WEDNESDAY EVENING, OCTOBER 30, 1920

The President called the convention to order at 8 P. M.

**GREETINGS FROM THE AMERICAN FARM BUREAU FEDERATION**

**THE PRESIDENT.** I will now call upon Dr. True to bring us greetings from the American Farm Bureau Federation.

A. C. True of the States Relations Service: I attended last week a meeting of the executive committee of the American Farm Bureau Federation, at Chicago, and they commissioned me to bring to this association their greetings and best wishes. They also desired me to state that they wish to have in the fullest measure the assistance and advice of the land-grant colleges and to help in any way that they can to strengthen these institutions as regards their resident teaching, research, and extension work.

The committee took certain action at Chicago which they wished me to bring to your attention.

It seemed to them a desirable thing, in view of our cooperative relations in extension work, that the Farm Bureau Federation should have a special committee on extension work. They therefore established such a committee and appointed the following gentlemen, members of this committee: H. E. Taylor, of New Jersey; James W. Morton, of Georgia; and C. E. Gunnels, representing the officials of the Farm Bureau Federation. It is expected that this committee will confer from time to time with committees of this association on important matters of mutual interest.

They are also much interested in having at the colleges certain courses of instruction in rural economics and took action with reference to this matter as follows:

"The executive committee of the American Farm Bureau Federation recommend the establishment at the leading agricultural colleges of special marketing courses for the standard farm products, each college to make a specialty of the product which is of particular interest to the State, as for example—hogs in Iowa; wheat in Kansas; corn in Illinois; citrus fruits in California; cotton in Texas; cattle in Nebraska; and dairy products in New York.

"The commodity specialists teaching these courses must eventually through their research become thoroughly familiar with the economic and statistical phases of the production, distribution and consumption of their products, such as cost of production, effect of new methods of production, economic relation to other commodities, grading, transportation, manufacture, wholesaling, retailing, and exporting, as well as special strategic facts which may suddenly have a bearing on supply and demand.

"We also recommend the establishment at one or two of our agricultural colleges of very complete graduate courses in economics and statistics, in order to fit men with a farm viewpoint to represent agriculture on public and industrial commissions and on such national economic bodies as the Federal Reserve Board, and also to represent farmers successfully at the terminal markets and in the export trade."

Action also was taken with reference to the commercial activities of farm bureaus:

"The county farm bureau, as an organization, should not engage in commercial activities. It may encourage, however, the organization of such activities or industries as may seem necessary and advisable to the



Board of Directors. The same principle should be applied to the activities of the State federations of farm bureaus."

**THE PRESIDENT.** I have the very great privilege and pleasure of presenting to this convention the Secretary of Agriculture, Mr. Meredith.

**ADDRESS OF THE SECRETARY OF AGRICULTURE, EDWIN T. MEREDITH**

#### **COOPERATIVE RELATIONS IN AGRICULTURAL DEVELOPMENT**

This, in a real sense, is a family gathering. The institutions we represent are dedicated to public service, and we are seeking in many of our activities to attain a common object—the strengthening of our national foundations by the upbuilding of our great basic industry. I take it, therefore, that we may discuss our mutual problems with the candor that should characterize the interchange of views among members of the same household; and I know you will believe me when I say that I count it a privilege and an honor to appear before this association, which includes in its membership the men who to-day are shaping the destiny of agriculture, men who must play an important rôle in meeting some of the increasingly difficult and complex problems confronting us at this time and those which will arise in the years that lie immediately ahead.

I shall not attempt to indicate to this body what these problems are or are likely to be. It would be presumptuous for me to do so. There are men here to-day who are far better qualified than I am to deal with such questions in a comprehensive way, and we must look to them for advice and guidance. I do wish, however, to discuss with you some matters of mutual concern to the land-grant colleges and experiment stations and to the Department of Agriculture.

The Department of Agriculture was brought into being 58 years ago. Two years later the land-grant colleges were established. For more than 20 years these great agencies worked together for the betterment of agriculture before there came into existence the agricultural experiment stations; and these three sets of institutions have made contributions of untold value to the science and practice of agriculture. They have cooperated, and are cooperating, with each other in innumerable ways, but there still exist many opportunities for the further development of our cooperative relations. In a few cases, and I am happy to say that they are very few, the colleges and the department have been pulling at cross-purposes—not because the ends they wish to attain are different, but because they do not thoroughly understand one another and are using different methods—with resulting lost motion that could probably be avoided by closer contact and understanding.

#### **CLOSER COOPERATION NECESSARY**

I am anxious to do everything in my power, while I am in the Department of Agriculture, to aid in promoting the more effective coordination of efforts among our agricultural agencies within their respective fields. Much has been done along this line within the past few years, but much remains to be done. Cooperation is a word that is very much in vogue these days, but, generally speaking, I think its true meaning is little understood. Certainly there can be no thoroughgoing cooperation unless there

is a real desire to cooperate, and, it seems to me, that both the colleges and the department should overlook no opportunity to develop such a spirit—a desire to cooperate—among their workers. No matter how many agreements we enter into, their purposes can not be fully realized unless this spirit is fully developed, unless there exists between the parties to them a genuine feeling of mutual confidence and good will and an earnest desire and willingness to be helpful to each other. Your Association, through its appropriate committee, recently suggested the desirability of appointing an officer in the department whose specific duty it would be to promote better relations and closer coordination of work between the colleges and stations and the department. I have accepted this recommendation in the spirit in which it was made, and I am convinced that its adoption would be mutually beneficial to all these agencies. I have, therefore, recommended in our estimates for the next fiscal year, which have just been submitted to the Congress, that authority be given to appoint a director of scientific work, at a salary of \$7,500 per annum, who shall be a permanent officer and who will devote his attention not only to the development and coordination of the research activities of the various branches of the department, but who will also work out and put into execution plans for the further correlation of these activities with those of the appropriate State agricultural agencies. I may add that I have also asked Congress for authority to appoint a director of regulatory work who will function in essentially the same way with reference to the regulatory work of the department.

#### MUST GIVE MORE THOUGHT TO RESEARCH

I do not need to remind you gentlemen of the basic importance of research—and I use the word in its most comprehensive sense. It is the foundation of agricultural progress. Without it many of our agricultural activities could not exist under present conditions and others would be seriously crippled. All our most important problems along control lines are based on years of patient research. Swine production in a large way is dependent upon hog-cholera control; the cattle industry upon tuberculosis eradication, and in the South upon cattle-tick eradication; the fruit industry upon scientific methods for the protection of both trees and fruit; many field and truck crops upon methods of disease control, the introduction and development of new varieties, and the working out of improved cultural methods and practices.

I might go through the entire range of agriculture, giving illustrations of the application of the results of scientific study to everyday problems, but it is unnecessary for me to do so here. Indeed, so much has been accomplished through the results of research that many people are dangerously near falling into the error of thinking that not much more work of this character is needed and that the requirements of the day relate merely to the application of knowledge already in hand. Research is more essential now than ever before, and the need does not relate wholly to the matter of taking care of the future. We are confronted to-day with serious problems of the most pressing nature about which we know very little. A striking instance is contagious abortion of cattle, a disease which handicaps the cattle industry of the country to an enormous degree. We have no successful method of combating it. Another is the breeding of

domestic animals, which is still largely a matter of chance, and entirely too little fundamental research work upon it is in progress. No one will deny, I am sure, that it would be the part of wisdom to concentrate the best brains of the country on this important problem and to provide adequate facilities for carrying on the work in the most comprehensive manner. Still another problem about which we know relatively little is that of the control of animal parasites. In large areas of the United States they constitute perhaps the greatest limiting factors in animal production. In every section they are problems of importance. I am told that there are probably forty different parasites, about many of which we have little exact knowledge, that affect hogs alone. To acquire the needed information and to work out proper methods of preventing or controlling these pests a great deal of research of the highest order is necessary.

#### MUST FACE SITUATION FRANKLY

There are numerous other problems of equal importance and urgency relating to the soil, to plant diseases, to plant breeding, and to all other phases of agricultural production.

We must be frank enough with ourselves to recognize the fact that fundamental research has not gone forward as rapidly as our best interests demand, and it seems to me that the time has come for us—the colleges and stations and the department—to see that it is given and retains the proper place in our respective organizations. I am sure that nowhere has the importance of research been consciously minimized, but, in the exigencies of war and its aftermath, a situation has come about which, I think you will agree, amounts to neglect of this basis of agricultural progress. The rapid growth of extension work, the value of which I fully appreciate, has contributed to this result. We have been so busy with extension, so amazed also at the rapidity of its growth and application, that we have not found time to give to research, during the past few years, the careful planning and deep thought that it should receive. Unless we are to permit an insidious undermining of the whole structure that we have reared through six decades of tireless work, we must have a larger number of thoroughly trained and experienced investigators to give their time exclusively to research. Upon the agricultural colleges rests the responsibility of training the agricultural leaders and investigators of the future; they must provide the men and women needed by the experiment stations and the Department of Agriculture for the prosecution of their activities. There is a community of interest, therefore, among these three agencies in dealing with this great problem and in seeing to it that there is constantly available an increasing number of well-trained and thoroughly grounded men and women to carry on the work intrusted to them.

#### NEW SET OF PROBLEMS TO SOLVE

There are many lines of research which are relatively undeveloped and to which, it seems to me, the department and the colleges in cooperation should give more attention in the future. I have in mind especially the study of the economic problems involved in marketing and distribution, in farm management, in land utilization and settlement, and in cooperative

effort among farmers for various purposes. Until a few years ago relatively little systematic work had been done to aid in the solution of the complex problems arising in connection with the distribution of farm products. Now the Bureau of Markets of the Department of Agriculture is actively at work in this field, and many of the land-grant colleges, to which the bureau must necessarily look in recruiting its personnel, have established courses in marketing, but I imagine some of these courses could be strengthened and that others could be developed. The activities of the Office of Farm Management and Farm Economics have, within the past two years, been redirected and expanded so that it is now in position to deal more effectively than ever before with broad economic problems, including farm management, land settlement and utilization, and the like; and here again the department must depend upon the colleges to provide the necessary number of trained men.

Another line of work that could well be enlarged is that relating to the development of processes for converting perishable farm products into commodities sufficiently staple to be carried during the season of plenty to the period when they are actually needed. The fact that they can not now be so carried results in the marketing at one time of larger quantities than can be disposed of profitably and demoralization of the market follows, with consequent loss to the farmers. Industries founded upon the utilization of farm products in seasons of excess are of tremendous permanent value. As an illustration, I may cite the investigations conducted by the Bureau of Chemistry looking toward the development of a citrus by-products industry for the utilization of cull and surplus oranges and lemons. The effort of the bureau to aid in the establishment of a dehydration industry is another instance. Still another is the task of developing technological processes for preserving perishable food products. This is illustrated in the studies of the Bureau of Markets and the Bureau of Plant Industry in the preservation of fruits and vegetables and of the Bureau of Chemistry in methods of packing, shipping and storing poultry and eggs. Then there is the problem of providing outlets for waste products, of which the utilization of corn cobs for the making of adhesives, cellulose, furfural, and other valuable products is a striking example.

#### BETTER ENGINEERING COURSES NEEDED

Much remains to be done, also, in developing the field of rural engineering. This is one of the newer branches in the department and in the colleges, and a number of the latter, I believe, have not yet instituted courses for the training of men along these lines. Some of the large problems with which the farmers have to deal are engineering in character. No uniformity now exists in the rating of farm machines, such as silage cutters and blowers, pumps, and other farm equipment. Comprehensive tests have not been made of farm power, either mechanical or animal. The Bureau of Public Roads proposes to inaugurate a comprehensive study of mechanical power on the farm in cooperation with the agricultural engineers of the State colleges, and the problems relating to farm buildings, heating, lighting, ventilation, and the like should be studied in the same manner.

The colleges can perhaps do more than any other agency to bring

about a better recognition of forestry as an essential part of agricultural science. The depletion of our timber supplies has reached such a stage as to make it incumbent upon both the colleges and the department to begin a definite and earnest effort to solve the problems of timber production on the farms. A beginning already has been made along this line in a few States and I hope that others will turn their attention to it in the near future. I may add that the department is planning to ask Congress for an increased appropriation to further a national program of forestry and, if it is granted, it will be in position to prosecute the farm forestry project vigorously in cooperation with the colleges.

#### MUST TRAIN MEN IN METEOROLOGY

Practically nothing is being done, outside of the Weather Bureau of the department, toward the development of meteorology as a science. Less than half a dozen institutions in the United States have definite courses in meteorology, and these are inadequate to meet the requirements. As a matter of fact, few students have expressed a desire to pursue courses of this character because opportunities for employment in meteorological work have been confined almost entirely to the Weather Bureau. Recently there has been an increased interest in meteorology resulting from the unprecedented development of aviation and aeronautics, and more attention is being given than ever before to the utilization of meteorological data in connection with commercial and agricultural activities. The time is fast approaching when there will be many opportunities for the employment of highly trained meteorologists in many lines of industry, and the development by some of the land-grant colleges of adequate courses in this branch of science is worthy of consideration.

There are still large problems unsolved in connection with the extension work. The county-agent system is not complete. At least 600 counties need county agricultural agents; about 1,800 counties have no home demonstration agents, and only a small fraction of the farm boys and girls are being reached by the club movement. The great need at the present time is for well-trained men who can carry on this highly useful and immensely important work, and the land-grant colleges, of course, are the proper agencies to train them. The rapid growth of the farm bureau movement and the increasing interest among farmers in the economic problems of agriculture, especially in marketing and transportation, has led to a situation in which the educational value of extension work is likely to be endangered by monopolizing the time and energy of the county agent in purely commercial transactions. We must study this problem with the view of working out policies under which the needs of the farmers in cooperative marketing and other business affairs may be met without impairing the educational feature of the extension work.

#### FULLER INFORMATION FOR FARMERS

This leads me to suggest that more attention should be given, both by the department and the colleges, to the furnishing of information to farmers, through the extension service and in other ways, regarding the supply of agricultural commodities not only in the hands of agencies in this country but also those available in other sections of the world. This

information should be presented in such a way as to show clearly to the average farmer the probable effect that existing supplies will have on future prices; and, in connection with the development of processes for utilization of surplus products, it would be a great aid to them in regulating their planting and marketing operations so as to reduce many of the losses they are now compelled to suffer. It is not my thought that the colleges and the department should undertake to advise farmers specifically what they should or should not produce during any season, but rather that they should place the facts before the farmers in such a way that any intelligent farmer might decide for himself what he should do.

When all is said and done, neither the colleges nor the department can render the most effective service unless they have an adequate, well-trained personnel, and the problem of securing and maintaining such a personnel is of mutual concern. If we are to discharge our responsibilities to the public, we must see to it that the salary standards and opportunities, both of the colleges and the department, are such as to attract and hold the ablest and most far-seeing scientific men in America. The turnover in the department, especially among the research workers, has reached an alarming stage and we are threatened with a serious disintegration of the service. I assume that the colleges are confronted with essentially the same situation. Unless something is done to remedy existing conditions we can not hope to maintain the integrity of our research and other activities. Valuable men are leaving us constantly for salaries two, three, four, and even five times as much as we are able to pay them. It is not to be hoped, of course, that we can ever meet that kind of competition, and, in fact, our scientific men do not expect it. As a general rule they do not feel that we should pay them as large salaries as they could secure in private employment, but they do feel—and I am in full sympathy with their view—that they should receive compensation sufficient to enable them to keep themselves and their families in reasonable comfort. Unless we can pay them more adequate compensation our institutions will continue to be drained of many of their most efficient workers, and in time a serious, almost a fatal, blow will have been struck at the root of agricultural progress, because much of the work done by the Department of Agriculture, by the agricultural colleges, by the agricultural extension agencies of every kind, rests, in the final analysis, on the results obtained by the research workers.

#### SCIENTISTS MUST HAVE BETTER SALARIES

It is of the utmost importance that the colleges and the department should be in position to retain their scientific workers over long periods. From the standpoint of public service, a man once embarked in an important field of investigation, if he is capable and efficient, should remain there for the rest of his active career. If he leaves to accept other employment, he carries with him much of the information he has secured in the progress of his work which enriches him in experience but which cannot possibly be put on record. This means, of course, that a new man continuing the problem must, in many instances, go over a considerable part of the field already covered before he reaches the point where his predecessor left off. In dealing with this vital problem of personnel there are many ways in which the colleges and the department can coop-

erate to mutual advantage, and it behooves us to do everything in our power to see that the present situation is remedied, and remedied promptly.

Our inability to pay adequate compensation to our scientific workers is due to the lack of sufficient funds, or to limitations placed on the discretion of executive officers by Congress or the legislatures of the various States, and these, in turn, are due in large measure to the lack of understanding on the part of the public of the importance of research work. The only way, or at least one way, by which this situation can be corrected is for the colleges and the department to combine in an effort to outline the great and pressing problems in the field of agriculture and to emphasize the importance of their solution so that the cooperation of all the people of the country may be secured.

#### CULTIVATE PUBLIC OPINION

It seems to me that, on the whole, we have given too little attention to public opinion as it relates to agricultural problems. Any misconception on the part of a large group of individuals as to the true function of public institutions relating to agriculture is almost certain to retard progress. Generally speaking, the consumer thinks that agricultural institutions, including the colleges and the department, are maintained for the benefit of the farmer and for his benefit alone. This, of course, is not true. These institutions are serving, with a high measure of efficiency, the whole people, urban as well as rural. During the past 50 years the relative decrease in agricultural population and the increase in urban population has been very marked. Yet, on the whole, the smaller percentage of persons engaged in agriculture has produced adequate supplies of farm products. Increased efficiency directly attributable to the work of agricultural institutions has certainly played an important part in bringing about this result. Everything done by them that has helped to increase production and to eliminate wastes not only has added to the farmer's income but has also benefited the city consumer. This fact, however, is not generally understood. One of the tasks ahead of us is to see that such an understanding is conveyed to the public; that it is demonstrated to the people in the cities, as well as those in the rural districts, that the funds devoted to agriculture are not used in the interest of the farmer alone but in the interest of the consumer as well.

The means for accomplishing this end ought to be carefully considered and then put into operation as promptly as possible. We should overlook no opportunity to present agricultural problems in the most attractive and effective way to city organizations, such as boards of trade, chambers of commerce, community associations, the press, and others. Emphasis should be placed on the dependence of the city man on the agricultural community, both as a source of food supply and as a market for manufactured products, on the fact that farming, if it is to continue to meet the Nation's requirements, must provide an adequate return to those engaged in it, and on the necessity of making country life more attractive. We should emphasize, too, the common interest of the farmer and the city man in such problems as those of providing a sufficient farm labor supply, adequate transportation facilities, and ample finance for agricultural needs.

## PROFIT BY LESSONS OF WAR

In closing, I wish to emphasize again my earnest desire to do everything in my power to promote closer and more effective cooperation between the department and the colleges. The war taught us the value of cooperation and we should not fail to take full advantage of the lesson we have learned at such great cost. We all know the part that science played in the winning of the war, and that it was not until the scientific men of the allied countries united in solving the complex technical problems of warfare that victory was assured. Lack of cooperation between the agricultural agencies of the Nation would, I believe, be prevented or obviated by better knowledge on the part of each organization of the aims and viewpoints of the others. The appointment of a director of scientific work in the department will, I am sure, do much to bring about closer relations, and it occurs to me also that a system for the exchange of scientific workers is worthy of consideration. By this I mean that it might be feasible to develop a plan whereby men working along special lines in the various branches of the department might be exchanged, in limited number for limited periods, with scientists working along similar lines, either as research men or as teachers in the colleges. In this way the department's methods of work and of handling problems would be carried to the colleges and their methods of work and their way of considering and dealing with problems would be brought to the department, with benefit to both. Such a plan, it seems to me, would result in closer contacts and better understanding, and would lead to new ideas in both organizations relative to the important lines of research and other work to be undertaken.

For the department I wish to say that it is our hope and our desire that there may be strengthened wherever possible the close relationships now existing between us, hoping that we may be of increased service to you, and knowing that we will receive great help and inspiration from you in carrying forward together work for the development of agriculture, the basic industry of the country.

THE PRESIDENT. I am very sure, Mr. Secretary, that I voice the sentiment of every member of this association in formally thanking you on behalf of the Association for this timely and inspiring address.

THE PRESIDENT. I have the honor of presenting Dr. Alonzo E. Taylor of the University of Pennsylvania who will address us on the subject of the world's wheat supply.

## THE WHEAT SITUATION AT HOME AND ABROAD

BY ALONZO ENGLEBERT TAYLOR

When we state that price follows the law of supply and demand, we assume that need and demand are synonymous, that need finds expression in buying power. A tabulation of the needs of the wheat-importing countries and of the exportable surpluses of wheat-exporting countries indicates that the world carryover from this crop-year into the next will be small or nothing. It is difficult to determine the requirements of the importing nations. Last year Europe, outside of Russia, consumed, in terms



of tons, about 80 percent of the bread grains of the pre-war figure for consumption. The population of Europe, outside of Russia, is probably a little lower than it was in 1913. One cannot take the figure for pre-war consumption, subtract from it the figure for the crop of the present year and designate the difference as import requirement. One must first know the extraction in milling. This has risen in the various countries of Europe from the pre-war practice of about 70 percent to 80, 82, 84, 88 and even 90 percent in different countries. The pre-war consumption of bread cannot be used as the basis of calculation. Everywhere in Europe people are consuming relatively more of cereals and less of animal products. To determine the import requirement, one must know the bread programme as well as the crop of the country.

Let France be cited in illustration. The present crop of wheat and rye in France, ex seed, is about 8,000,000 tons. If this were milled to 82 percent and the consumption of bread were to be the same as before the war, this would carry the country through without import. Before the war, bread contributed about 50 percent of the calories of the diet. During the war years this has risen to 60 percent. If the present bread consumption is to be maintained, France will need to import over 50,000,000 bushels of wheat.

Another factor influencing the situation is feeding to domesticated animals. In most of the countries of Europe it is more profitable to the peasant to feed bread grains to domesticated animals than to sell them to the government for milling or to the mills direct. For the Food Controller the crop of bread grains represents what he can secure for bread, not what the Department of Agriculture reports as the crop estimate.

A final factor that must be taken into consideration is price of bread. The peoples of Europe increased the consumption of cereals during the war and since the armistice, not only because cereals were naturally the cheapest foods but also for the additional reason that bread was subsidized. During the war the four-pound loaf was sold in the United Kingdom and in Germany for about the same price, 18 cents in our money. Last year France paid the peasant 75 francs per quintal for wheat and sold it to the miller for 53. The huge bread subsidies of European countries have exaggerated their budgetary deficits. One by one the governments have come to the realization that this practice cannot continue and the bread subsidies are being suspended. The result is a sharp increase in the price of bread. During the coming year the peoples of Europe will pay more than twice as much for bread as they did last year. This would tend to reduce consumption of bread if cheaper foods were available. But even at the increased price, bread is still the cheapest food in Europe. Therefore, it is not to be anticipated that the high price of bread will lower consumption except by forcing down the standard of living. It is tragic to have to drive up the price of bread in Europe, at a time when the well-being of the world requires deflation in prices. But the governments have imperative fiscal reasons. The domestic bread subsidies are paid for with paper money. Imports must be controlled and such control is best attained under the natural price level of commodities.

The following table presents the wheat import requirements of the nations of Europe in millions of bushels:

<i>Country</i>	<i>Minimum</i>	<i>Maximum</i>
United Kingdom .....	220	250
France .....	45	75
Italy .....	65	85
Belgium .....	40	50
Germany .....	50	75
Poland and Austria .....	30	50
Other Europe .....	100	100
Non-Europe .....	50	50
Total .....	600	735

These figures represent, I believe, the conclusions as to import requirements to be drawn from the best available information on crops and bread program. Future developments may expand or contract consumption beyond the ranges indicated in the figures. So much depends upon exchange, transport, severity of winter, and social stability.

The United Kingdom, France, Belgium, Other Europe, and Non-Europe can finance their requirements. Germany, Italy, Poland, and Austria do not possess the tangible resources to finance theirs. The higher figures may be expected to represent the probable imports for the countries of financial capacity; the lower figures, the probable imports for the countries of financial incapacity. The United Kingdom, France, Belgium, Other Europe, and Non-Europe are in position to program their importations through the year. Germany, Italy, Poland, and Austria are not in position to program their importations. They will consume their own grain largely during the first half of the crop-year and then as their stocks run low, will engage in frantic efforts to cover their needs during the spring and early summer months. The crop of Austria for example will not carry the country through December and yet they have no program of importation arranged. The German wheat and rye crop is below the average crop for the present German territory. According to the German Food Controller, the importation of 50,000,000 bushels of wheat or rye would enable him to maintain the present ration and bonuses for workers. This is an unsatisfactory ration and at least another 25,000,000 bushels is necessary to increase the bread ration for heavy workers. This would afford the Germans something below a pre-war bread ration, made of flour of high extraction. But other foods are so short that the total diet would still be on a minimal basis. Bread is under ration in Italy, the use of flour for paste is restricted, and importation of grain is under governmental control. The authorities of India, China and Japan, are urging their peoples to consume more wheat, in the endeavor to escape the centuries-old dependence upon rice.

The available exportable surpluses of wheat may be stated as follows, in terms of millions of bushels:

United States .....	290
Canada .....	200
India .....	15
Australia .....	85
Argentina .....	90
Balkans .....	75
Total .....	755

Each of these items demands explanation.

In the figure for the United States is included 40,000,000 bushels of rye. The wheat crop of this year is now given as 750,000,000 bushels. This figure is somewhat lower than the estimates of the trade. Since we are unable each year to account for some 30,000,000 bushels of wheat of the figure for the crop estimate, it is safer to use the lower figure. The total wheat available is 900,000,000 bushels. Out of 900,000,000 bushels we ought to be able to export 250,000,000. It would leave us with a very small carryover on July first. Exports from July 1 to October 10 were about 125,000,000 bushels. At the rate at which wheat has been going out, this volume of exportation will be attended with few transportation difficulties.

The figure of 200,000,000 bushels for Canada is based upon the crop figure of 290,000,000 bushels. Canada has once exported more than this. The trade in Canada regards the official forecast as too high.

The figure given for India, 15,000,000 bushels, is the amount officially designated for export to date. The last crop was reported as nearly 10,000,000 tons. This should have afforded 60,000,000 to 70,000,000 bushels for export. The early monsoon was not satisfactory and this made the government cautious. The wheat crop of India is not yet made and if adverse climatic conditions persist, exportation may be embargoed. But the chief reason for restriction lies in increased consumption in India. During the past three years the consumption of wheat and rice in India has been much more than in the pre-war period, an expression of increased buying power. Today the European workman has not such a production of commodities desired by the East Indian as to enable him to draw wheat heavily from India.

Australia and Argentina are practically empty of wheat. The figures given represent the exportable surpluses to be expected out of the new crops in the coming January, assumed to be normal.

The figure for the Balkans includes the exportable surpluses of Bulgaria, Roumania and the Kingdom of the Serbs, Croats, and Slovenes, reported to the writer by Americans resident in Europe and in touch with the situation. Undoubtedly the grain is there, but who is to buy it? Germany, Italy, Poland, and Austria ought to buy it. Poland and Austria have little to offer in exchange; Germany and Italy not much more, in the present state of their industries. Italy is able to supply to the Balkan States textiles manufactured by water power, but she cannot offer machinery, hardware, or shoes. Poland has purchased some 18,000 tons in the Balkans, probably all she can finance. During the coming year her exports will be limited to petroleum, salt, and lumber. She cannot use these exclusively for purchase of food because she must also import coal. Austria has potentially few exports outside of manufactured articles and these she cannot produce on account of scarcity of coal and raw materials. The Balkan States will not sell on credit. They cannot accept the paper money of Poland, Austria, Germany, and Italy. They want manufactured goods—clothing, shoes, agricultural implements, hardware, and so forth—or bills of exchange on nations that can furnish these commodities. The United Kingdom, France, Belgium, and Other Europe find it more advantageous to secure wheat from overseas than from the Balkans. The Balkan States had last year an exportable surplus of 30,000,000 to 40,000,000 bushels of

wheat. Most of it was fed to animals, because no one in Europe could buy it. It is likely that most of the exportable wheat of the Balkans will again be fed to animals, because no one can buy it.

Russia we disregard entirely. Central Russia has suffered a failure of the rye crop. In any event, grain could not be moved out of Russia, if there were an exportable surplus, on account of breakdown of transport. The condition of Russia is almost as distressing for Europe as for herself.

It is clear from these figures that the imports and exports practically balance. If the importing nations consume the lowest stated amounts, the world might have a carryover of a 100,000,000 bushels (more or less marooned), practically negligible as a world carryover. If consumption in the importing countries approaches the desired figures, the first of next July will find the world without any carryover in bread grains. It would require 200,000,000 bushels more to get Europe, outside of Russia, off wheat control and the bread ration. If such a situation between supply and demand had existed before the war, it would have resulted in a stable price of wheat. Under present circumstances, however, wheat has fallen 70 cents a bushel within a few weeks. Abnormal factors, loss of buying power, arising directly and indirectly from the war, prevent the world supply in wheat from determining a corresponding world price of wheat.

The factors tending to reduce the price of wheat may be classed under seven headings, not because the classification means anything but merely for the sake of precision. The fall in the price of wheat in terms of percent is less than half that observed with the coarse grains.

1. The fact and psychology of falling prices. Many raw materials have descended in price; rubber, copper, jute, cotton, silk, wool and hides. "War prices must go." The psychology of price reduction in automobiles and silk shirts extends to the wheat field. Since deflation must occur, the mob instinct tends to force reduction in prices of all commodities, whether plentiful or scarce. Prices of corn and oats have fallen more than other materials, wheat not as much. If in driving down the cost of living we discourage wheat planting, we may pay for it later in a higher price for bread. If the agricultural classes receive this year for their produce \$5,000,000,000 less than last year, the consequent contraction in their purchasing power will exert a heavy influence upon urban industries.

2. Scarcity of credit. The farmer is a borrower. Loans are by custom supposed to be paid when the crops are marketable. Normally the farmer sold his grain and paid his loans as soon after the harvest as practicable. The national treasury is urging deflation and retrenchment. The central banks urge liquidation on the country banks. The tendency is to press the grower to sell, even in the face of falling prices. To hold wheat, growers need enlargement as well as extension of credit. In the international sense also, scarcity of credit depresses price. Buying nations with low credit display feeble competition in purchase. If our wheat could be sold on credit, the price would rise buoyantly. It would be cheaper for Italy to buy American wheat at \$4 a bushel on credit for ten years, at eight percent interest, than to buy cash wheat at \$2 with the lira worth four cents. The influence of the credit sales of the United States during the past two years in maintaining stability in prices will only be fully appreciated after we have had a year's experience in marketing our exportable surpluses on a commercial basis. Credit extended to the farmer

to enable him to hold wheat means little until he finds the ultimate buyer. Credit to the wheat buyer in Europe would be much more effective than credit to the wheat grower. Last year the United States, the United Kingdom, France, Italy, Scandinavia, Holland, Switzerland, and the Argentine Republic sold foodstuffs on credit to the nations of Central Europe. The writer does not favor extension of governmental credits to the nations of Europe for purposes of reconstruction, for the one valid reason at least that under present circumstances the resources thus acquired would be employed largely for political programs rather than for industrial reconstruction. But no one can refuse to consider a governmental credit of small dimensions to alleviate famine. According to the observations of the writer, the food resources of Central Europe are so low that death will claim millions before the next crop, unless the British Empire and the United States supply some grain on credit. This will be merely a repetition of the circumstances of last year. If we have to sell 50,000,000 bushels of wheat on credit to Central Europe, in one way or another, the sooner this is recognized and programmed, the better for the consumer in Central Europe and the producer in the United States. Bonds of European governments are being sold in considerable volume in this country, but the proceeds seem in large part to be destined for use in the borrowing countries rather than for the purchase of wheat in the United States. Europe has little gold, securities or goods to export. When she offers notes for wheat, that does not bull the market. "Money talks", but not European paper money.

3. We have large crops of the coarse grains. The country is long on feed. When one contrasts the huge crops of coarse grains and fodders with the low count of animals, it seems clear that we must expect a heavy carryover of coarse grains. Before the war there was an approximate price relationship between wheat and corn, about ten to six. The corn tends to pull the price of wheat down, but the wheat does not tend to pull the price of corn up. The wheat price ought to show an index number relatively higher than oats, corn, or cotton, higher also than hides, rubber, wool, silk, copper, or iron.

4. Less wheat will be milled this year than last. Last year we exported some 21,200,000 barrels of flour, the year before some 29,000,000 barrels, the pre-war export was some 11,000,000 barrels. It was the policy of the Food Administration and of the Grain Corporation to favor export of flour instead of wheat and keep the mill-feed at home. With an open market, it is the policy of the foreign buyer to draw grain. In addition, the Shipping Board has given wheat a preferential rate over flour. Since the mills grind less, they compete less as buyers.

5. American mills purchase Canadian wheat cheaper than domestic wheat of the same grade, on account of the depreciation of the Canadian dollar. There is no import duty on Canadian wheat. Canadian flour can undersell in the United States domestic flour ground from domestic wheat. Naturally the miller imports as much as he can, which tends to depress the price of domestic wheat. Canadian wheat displays this year a higher quality than that possessed by our spring wheat. If our growers hold back wheat, that will result in increased consumption of Canadian wheat in our mills. The more Canadian wheat we use, the larger the amount of domestic wheat for which a foreign buyer must be found.

6. Defective transportation. Fluid transport tends to equalize price differences, defective transport exaggerates them. Last spring wheat was over a dollar higher at seaboard than in Kansas. One sees elevators in Kansas today filled with wheat bought at \$2.25 that has not been shipped out for lack of cars. The breakdown is largely zonal and depresses prices by damming back the product. Had the American railways been no more efficient this fall than they were last fall, the movement from the farms would have been less than it has been, the stagnation much greater and depression of price on the farm more profound.

7. Attitude of European buyers. Up to a few months ago, practically all imports of wheat into Europe went through or were controlled by, the Inter-Allied Wheat Executive and the British Royal Commission on the Wheat Supply. These organizations are being dismantled and each nation is trying to buy its own wheat, except that Germany and Austria must make importations under the supervision of the Reparations Commissions. In theory there is competition between these importing nations. In practice, however, the nations do not compete as freely as before the war. Their finances are more or less entangled, so that freedom of action is not obtainable, except in the case of the United Kingdom. They do not wish to compete and hold prices up. The world is back to freedom of trade. We have officially advised the nations of Europe that governmental credits are no longer to be extended, that commercial practices are alone to be relied upon. Under these circumstances, it is natural and proper for the buying nations of Europe to attempt to break prices. There can be little doubt that Europe is playing Canadian wheat against our wheat, in the hope of breaking the prices of both. When the Argentine crop appears, Europe will play wheat of the Plate against that of North America. It is idle to discuss whether there is a formal arrangement between the nations of Europe to this effect. It is futile to scan the daily exportation sheets for evidence of such understanding. Competition between the buying nations of Europe would be injurious to them all, it is to their mutual interests to break foreign prices. Under these circumstances it may be assumed that European buying is to some extent so conducted as to tend to lower the price of wheat in this country. The evenness of the flow of export wheat suggests a programme in importation and speaks against active competition between European buyers. The British have been accumulating wheat reserves for months, in anticipation of the possibility of the strike of the coal miners. Should this strike proceed to such lengths as to make bunker coal scarce, that would have a disorganizing effect on the food shipments of the world for months to come. In any event the United Kingdom can afford to import slowly until the crop of the Southern Hemisphere comes in.

The sum of these influences has resulted in extreme instability that constitutes the basis for the erratic and spectacular fall in wheat that has occurred since early September. With middlemen endeavoring to unload wheat already purchased, in order to avoid greater losses, the wheat exchange has been a buyer's market at a time when the wheat supply of the world would have justified a seller's market. Naturally, the situation is made-to-order for the speculator. The miller and exporter deal in futures to protect their supplies. The wheat pit is the hedging market for the grain merchants of the world. The speculator buys and sells for the direct

profit of trading. The farmer holds back his wheat, which has the same effect as buying futures. While it may seem to serve the momentary interest of the European to depress our wheat price, it would be to his future injury to depress our wheat acreage.

Two factors operate in the upward direction, tending to raise the price of wheat. The first is the general proposition, resting upon the realization that the world will need, by the first of next July, all the wheat available. The situation last year may be cited fairly in illustration, despite the fact that prices last year were controlled both here and in the other exporting countries. There was more wheat available to carry the world through the last crop-year than is in hand now to meet the requirements of the present crop-year. Last May wheat rose to over \$3 a bushel in this country, an expression of the desperation of Europe's need of bread. The ability to buy wheat at that price illustrated also that despite her deplorable financial plight, Europe is still able, or rather feels herself forced, to pay high prices for bread grains when bread stands as the bulwark against social disorder. Europe will need American wheat just as badly next spring as she did last spring. The exporter, trader, miller, and grower share the basal psychology that wheat is in a class by itself among grains and that sooner or later the world need of wheat may be expected to assert its rights in opposition to the current deflation psychology. The world price of wheat may be fairly compared with the world price of coal.

The second factor is specific; the daily buying for export. It is illuminating to contrast the curve of daily price with that of daily export since the first of July. Over 1,000,000 bushels a day pass out of the country, seemingly uninfluenced by falling prices. Apparently the buyers of these exports do not feel that they can hold back and await further fall in prices. Obviously also, the factors tending to depress prices have for the time being at least discounted the influence of the flow of exports. Wheat and rye exported since the first of July amounted on October 15 to nearly 145,000,000 bushels, of which 125,000,000 was wheat. By the first of November the total exports of wheat will be in the neighborhood of 140,000,000 bushels,—practically half the bread grains available for export from the present crop. On the first of July we are believed to have had in the country, in the carryover and in the new crop, some 900,000,000 bushels of wheat. Of this some 110,000,000 bushels were in the hands of the trades, 790,000,000 bushels in the hands of the growers and growers' elevators. During July, August, and September, the growers marketed some 320,000,000 bushels, leaving in their hands on October first presumably 470,000,000 bushels. On October first we had in the country some 600,000,000 bushels of wheat, 150,000,000 less than last year on October first. During July, August, and September, some 300,000,000 bushels had been exported or passed into use. If during this year we reserve 90,000,000 bushels for seed, grind 530,000,000 bushels and hold only 30,000,000 bushels as carryover, the sum of these plus export of 250,000,000 bushels would exhaust the stock. A continuation of the present rate of export would drain the country by the month of April. Under such circumstances, the price-raising influence of exports may become stronger each month. To this we must add the fact that the stocks of Europe become lower each month and late in the winter much more heroic efforts at imports will be exerted by European governments than is the case at the present time. This may have more effect here

than anticipated, if it be true that European purchases already made equal our total exportable surplus and that buyers next spring will compete with American consumers.

Farmers' organizations have suggested the placing of an import embargo on Canadian wheat. Theoretically we are still at war and technically we are living under the Lever Act. But the writer, from his experiences as a member of the War Trade Board, does not believe that the courts would sustain the act or that public opinion would condone an embargo. The Canadian position is many-sided. As a citizen of the British Commonwealth of Nations, it is to the interest of every Canadian to have the cost of living lowered in the United Kingdom, since this would be reflected to the Dominion in the price of her manufactured commodities. As a citizen of Canada, it is to the interest of the wheat grower to export wheat to the United States instead of to the United Kingdom, in order to wipe out the adverse balance of trade with the United States. As a wheat grower, it is to the interest of the Canadian farmer to cooperate with the farmer in the United States to secure the highest prices for North American agricultural products. The Canadian grower, objecting to the sale of his wheat in this country at a price lower than ours, has suggested an export embargo, or, alternatively, marketing by the government. The Ottawa government has the right to fix a minimum price for wheat, but cannot take over the crop and could not place an export embargo applicable only to the United States. In Argentina and Australia the governments possess the power to control but not to fix the price.

Conditions are so abnormal that no one can venture to forecast the price curve that will result between now and July from the operation of these opposing forces. If all American wheat should leave the farm at the present prices and next spring frantic European buying should drive the price to three dollars or more, as was the case last spring, this would produce a very unfortunate reaction both in Europe and in the United States. It would be difficult to convince the American grower that traders had not intentionally staged the situation. It would be difficult to convince the Europeans that North America had not intentionally exploited their misery. To the economist the result would represent the unfortunate but inevitable outcome of a situation in which the period of deflation of prices in North America coincided with non-recovery of the buying power of Europe.

When we consider our wheat price, we must recall that the price is higher to the European buyer on account of depreciation of exchange. This causes embarrassment to the importing governments, because the home prices of wheat are still largely controlled in Europe. In the United Kingdom the fixed price for domestic wheat is 96 shillings per quarter. With wheat at \$2.50 a bushel in New York, at the present value of the pound sterling the quarter costs 115 shillings. France pays the peasant 100 francs per quintal. At \$2.50 per bushel in New York, it would cost her here 166 francs per quintal. Italy pays her peasant 100 lira per quintal. At the stated price of wheat in New York, it would cost her 220 lira per quintal. Before the war, the wheat grower of the importing states of Europe had to sell down to the world price. Now he wants to sell up to the world price, but the governments do not want the paper-money price driven up.

The query arises whether Europe could not alleviate her situation by substitution of cheaper grains for wheat. For five years Europeans have



leen stretching wheat and rye with barley, potatoes, oats, and maize. In many countries of Europe dilution is being continued under state regulations. In other countries, where bread making is now decontrolled, as in the United Kingdom, dilution with coarse grains has been abandoned for the most part. One hundred and thirty million Europeans, outside of Russia, are still on bread rations. The masses long for normal bread. The same psychology that exclaims "down with war prices," cries out "down with war bread." In the southern half of Europe maize will be consumed to a greater extent than ever before the war. A degerminated corn flour of 50 percent extraction or a barley flour of 55 percent extraction could be advantageously employed in northern Europe. The corn flour would have to be manufactured in the United States on special order. Northern Europe will use barley flour of her own accord. If the Caucasian world is to be urged again to consume wheat substitutes, the lead in the movement should be taken in the United States, where the conditions are more favorable than in Europe or South America. But no one familiar with the atmosphere in the kitchen and in the trades believes that Americans will return to wheat substitutes during the coming year.

The fact and psychology of falling prices compels the farmer to inventory his futures, so to speak. The farmer manufactures a year ahead of his market. On the one hand the farmer has developed certain ideas of correct agricultural practice for his locality, with a particular diversity of crops in certain rotations. He realizes that it pays to follow correct agricultural practice. He has learned that profit in grain raising depends largely upon yield per acre. He knows that profit in animal products depends largely upon improvement in type. To abandon correct agricultural practice means to speculate, to deal in crop futures a year in advance. On the other hand, there is a certain leeway at all times within the confines of correct agricultural practice. Our agriculture proved this brilliantly during the war. The farmer is, therefore, tempted to modify his practices with the view to meeting future market conditions. Confining the discussion to the states where wheat is grown, the farmer must decide between planting more bread grains and less coarse grains or more coarse grains and less bread grains. In the winter-wheat states the decision cannot be postponed; in the spring-wheat states the farmer can watch the trend of animal husbandry during the winter before making his decision. Prices are falling and must fall. The farmer is trying to pick out the crop whose price will fall least. It would seem certain that this crop is wheat.

Wheat is a primary article of food, a non-perishable. Barley, oats, and corn are secondary articles of food, and perishables. The amount of oats, barley, and corn consumed directly as primary foods, contrasted with the total crops or with the amounts consumed indirectly as secondary foods in the form of animal products, perishables, is so small as to be negligible. Practically no sound wheat in the United States is fed to animals under normal circumstances, though this is not the case in Canada. The contrast between wheat and the coarse grains, therefore, resolves itself into the comparison between bread and animal products in the diet. The outstanding fact of the diet of Europe, developed during the war, maintained up to the present and inevitable for several years to come, is relative increase in bread and absolute decrease in animal products. Before the war,

cereals, largely bread, represented 35 percent of the calories of the diet in the United Kingdom; last year it was 50 percent. The figure for cereals in the diet has risen in France from 50 to 60 percent, and in Italy from 60 to 70 percent of the calories. The cereal intake of the Germans has not increased, but the consumption of animal products has decreased greatly.

Cessation of governmental credits has provoked a direct reflection of the situation in Europe in our figures for export of animal products. Europe is producing less animal products than before the war. Compelled now to import them on a commercial basis, she is importing less. Three years ago we exported to Europe 1,568,000 tons of animal products; two years ago it was 2,511,000 tons; last year it was 1,539,000 tons. During the current year it seems certain to fall lower and may approach the pre-war figure of some 800,000 tons. Animal products are almost everywhere restricted and rationed in Europe, even where bread is free. This is merely an expression of the fact that animal products furnish less calories per unit of currency than does bread or other cereal.

The European countries stand between Scylla and Charybdis. France some time ago encouraged exports and discouraged imports in order to protect the franc. Soon the prices of foodstuffs rose to an intolerable attitude. To combat the high cost of living, France now prohibits export of foodstuffs and encourages imports. The franc will fall in consequence. *Quo vadis?*

We have the largest crop of coarse grains and feeds on record. The corn crop is 12 percent above the average of the last five years. With falling exportation of animal products to Europe and little increase elsewhere in the world, it seems clear that the farmer cannot look abroad for the ultimate market for his coarse grains and feeds.

Can he look for an enlarged market at home? A review of the statistics of inspected packing houses and storage warehouses during the past few years indicates that our consumption was greater during the past fiscal year than during the previous year. Taking the figures for beef, pork, butter, and cheese together, we have the following table for production, exportation and consumption expressed in millions of pounds.

	1918-19	1919-20
Production .....	13,966	12,915
Exportation .....	4,115	2,130
Consumption .....	9,728	10,780

From this it is clear that production is decreasing slowly, exportation falling rapidly. When the stocks are subtracted, it is evident from the difference that consumption has increased. If consumption is to increase further during the coming year, this can only be accomplished if fall in production is checked or replaced by increase.

Is this possible? Have we the animals to increase production materially during the coming year? We have the feed and to spare. Can the American public be induced to consume more animal products than they did last year?

We have in the country apparently some 3,400,000,000 bushels of corn, crop and carryover. Human food, manufacturing uses and export cannot possibly account for over 300,000,000 bushels. We have in the country six percent less hogs and 10 percent less cattle than last year at this

time. With the heaviest feeding, a large carryover seems inevitable, unless corn is more widely used than ever for maintenance of animals as well as for masting. With the present condition of pasturage and the achieved crops of roughage, coarse grains and concentrates of all kinds, increased use of corn for maintenance does not seem probable.

If increase in production during the coming years is to be attained, this must be accomplished either by using more animals or by getting more product out of each animal. We cannot use more animals than during the past year because we do not possess them. But we can kill more animals for beef and pork products than were slaughtered last year, with the result of reducing still further the count of animals. If the American people demand more meats, we can slaughter more animals of comparable weights or we can feed up these animals to heavier weights, or both.

The proposition to increase the slaughter in order to get rid of the feed may not recommend itself to the American student of animal husbandry. What may be attempted instead will be to feed for heavier weights. To feed beef cattle for heavier weights means to finish cattle contrary to the best scientific teaching, since it has been demonstrated that conversion of grains into older and heavier cattle is less efficient than the finishing of younger animals. But in any event, it would not run counter to public taste, since the public esteems beef from heavy cattle. In the case of hogs, to produce heavier animals would run counter to public taste. The public has a preference for fresh pork, bacon, and ham from light hogs. To feed all hogs to heavier weights would mean to increase the production of heavy hams, lard, and mess pork and decrease the production of bacon and ham of preferred grades. This would result in lowering the price of lard and mess pork and might increase the price of bacon and ham. To flood the market with heavy hogs continually would certainly result in depressing the price of such animals. Whether an increase in consumption of pork products could be obtained in this country by making lard and mess pork cheaper and hams and bacon dearer, is at least questionable. If retrenchment occurs during the period of price deflation, can one hope to increase the consumption of meats?

Increased output of dairy products can easily be obtained by intensive feeding. The concentrates will be more plentiful this year than last, except mill-feed. From the standpoint of the health of the country, nothing better could happen than to have our excess feed protein converted into milk. Whether or not this is practicable from the producer's point of view, considering prospective market conditions in butter, cheese, condensed milk and fluid milk, is problematic. The ideal diet revolves around bread and milk.

It follows from all this that a profitable outlet for our bountiful crop of coarse grains and fodders is not in sight. Unsatisfactory as the grower may regard the price of wheat, it is and promises to be much less unsatisfactory than the price of animals.

Europe is unable to import animal products in large volume for financial reasons. The count of cattle and swine in Europe is reduced materially. The cattle and swine are thin; there is a scarcity of feeding stuffs. Only in England was the count of cattle maintained during the war and only there is the condition at all normal. Everywhere else, war, blockade, and embargo have decimated and emaciated the animals. Rinderpest and

food-and-mouth disease have established footholds. When Europe can finance importations of animal products, she ought to do it in the indirect sense, that is, import feeding stuffs and produce from her own animals. This she is trying to do, though on a scale much smaller than before the war. The United Kingdom, France, Denmark, Holland, and Switzerland are leading in the recovery of output of animal products. These countries are able to select their feed sources on a purely commercial basis. Germany cannot finance more than minimal importations of feeds. Poland, Austria, and Czecho-Slovakia are short of animals and of feeds. Hungary is short of animals but has plenty of feed. Roumania, Bulgaria, and the Kingdom of the Serbs, Croats and Slovenes are relatively well supplied with both animals and feed, but find it difficult to market their products. The importation of concentrated feeds into Europe must proceed slowly, otherwise the buying power of the consumers is soon exceeded. For example, Denmark and Holland are forced to seek markets in the Western Hemisphere for butter and bacon, although they are producing much less than their pre-war output.

Will Europe's requirements in coarse grains be covered in the United States? Not if they are purchased on a commercial basis. Argentine corn has been cheaper in New York than corn from the middle west. During the past six months Argentine has shipped to Europe a great deal of coarse grains, we have shipped little. There are several reasons why Europeans find importations from Argentine advantageous. The heights of the several exchanges represents a differential in favor of the Argentine exporter. Manufactured commodities from Europe meet with less competition in South America than in the United States. The largest importer will be the United Kingdom. She has a particular motive for importation from Argentine, because she can pay for grain with coal.

A review of the situation indicates, therefore, that the farmer of the United States finds little hope in Europe for an outlet for his coarse grains, either directly or in the form of animal products. The calamitous descent in the prices of corn and oats was strictly in accord with world conditions. We have produced a war crop after the war is over.

From all this it follows that where the characteristics of the soil and climate offer the farmer the choice between planting bread grains and coarse grains, the better promise lies with the bread grains. Of course, the farmer has another alternative. He can let the land lie fallow. Fallowing has a place in correct agricultural practice. The grain lands of the country have been severely taxed during the past six years. Many of these acres would profit by being allowed to fallow or be covered with grasses, as is being done in the United Kingdom. Judiciously selected, a smaller acreage planted to wheat would, with good climatic conditions, produce as large a crop as that of the present year.

In the popular insistence on reduction of prices, the public may fail to discriminate between important and inconsequential reductions. Because bread occupies the most prominent place in the diet, reduction in the price of wheat looms large to the layman; but it means little in the reduction of the cost of living. In the loaf of bread selling for eleven cents, the flour costs four cents, and of this the wheat cost three cents, in rounded figures. The seven cents in the loaf outside of the flour represents little of other ingredients; it is mostly labor, overhead, profit, style, and waste.

A reduction in the price of wheat would have no direct effect upon the seven cents. If wheat were reduced from \$2.25 to \$1.50 a bushel, that would lower the price of bread one cent from eleven cents. Such a reduction in the price of wheat would be calamitous to the grower; it would save the average American only about \$3 per year. Bread is already the cheapest food. A reduction of \$3 per annum in the bread bill is insignificant when one considers the reductions in the cost of clothing, footwear, and other manufactured commodities already accomplished. Wheat furnishes about one-third of the calories of the diet at about one-tenth of the price. The promising field for reduction in the cost of the diet lies outside of the cereals.

Price deflation is the order of the day in reconstruction. The history of panics illustrates that deflation should be sequential, continuous, equitable, and not too rapid. Market retrenchment of consumption in the period of price deflation is dangerous, because a healthy price deflation can only be maintained by increased production. In a period of price deflation the economic problem is to distribute evenly and equitably the spread of losses, rather than to attempt to have losses follow the cost of production. It is not possible to expect reduction of prices to the pre-war level. The present price of oats is an illustration of excessive reduction. Deflation should operate forwards rather than backwards. In the case of agricultural products, however, the price reductions of today represent value degradation of the finished product with cost of production of a year ago.

The United States is ceasing to be a food-exporting country. We are becoming a food-importing country. During the period of transition we lose the advantage of being a food-exporting nation but retain the disadvantages. We have not yet acquired the advantages of being a food-importing nation, but have the disadvantages. We enter upon this transition at the worst known period in the history of the modern world. The situation is pregnant with difficulties for American agriculture. It constitutes a period of hazard for the food supply of the nation. And the situation embarrasses us in our attitude toward the reconstruction of Europe. Sir Henry Rew predicted last year that "given settled social and political conditions" food production in Europe would return to normal after the harvest of 1921. Certainly with present social and political conditions in Europe, agriculture and industry will be long retarded.

On motion, the prompt issuance of Dr. Taylor's address as a separate was authorized.

#### COMMITTEE APPOINTMENTS

THE PRESIDENT. The chair announces appointments on the standing committees, as follows: (1) Instruction in Agriculture, Home Economics, and Mechanic Arts, A. C. True of Washington, D. C., A. B. Cordley of Oregon, Bertha M. Terrill of Vermont; (2) College Organization and Policy, R. W. Thatcher of Minnesota, W. M. Riggs of South Carolina; (3) Extension Organization and Policy, T. Bradlee of Vermont, K. L. Hatch of Wisconsin; (4) Experiment Station Organization and Policy, Eugene Davenport of Illinois, C. D. Woods of Maine; (5) Projects and Correlation of Research, H. L. Russell of Wisconsin; (6) Publication of Research, J. G. Lipman of New Jersey.

On motion, a recess was taken until 2 P. M., Thursday, October 21.

THURSDAY AFTERNOON, OCTOBER 21, 1920

The President called the convention to order at 2 o'clock.

THE PRESIDENT. The session will open with a report from the Executive Committee.

#### REPORT FROM THE EXECUTIVE COMMITTEE

R. A. PEARSON. (1) Certain resolutions have been presented as follows: These will be referred to the Executive Committee and to the Executive Body under the terms of the constitution (see p. 15).

(2) The Executive Committee was informed yesterday that tomorrow will be the seventy-seventh birthday of Dr. S. M. Babcock of the Wisconsin Experiment Station. The Executive Committee suggests that the following telegram of greeting and good wishes be sent:

Springfield, Massachusetts, October 22, 1920.

DR. S. M. BABCOCK, College of Agriculture,  
University of Wisconsin, Madison, Wisconsin.

Members of the Association of Land-Grant Colleges in annual meeting by unanimous vote send greetings on your seventy-seventh birthday and sincere wishes for the continuation of your good health and happiness and services to agriculture and mankind.

W. E. STONE,  
W. M. RIGGS,  
A. R. MANN,  
J. L. HILLS,  
R. A. PEARSON,  
*Executive Committee.*

[On motion, the suggestion was approved and the telegram sent.]

(3) The Executive Committee will issue Bulletin 3 as soon as possible after the conclusion of this convention. It will include a brief statement as to the action taken by the Executive Body.

(4) The Executive Committee has authorized the prompt issuance of Dr. Taylor's address as a separate.

(5) The Executive Committee has held a conference with the Secretary of Agriculture, the Assistant Secretary, and other leaders of the United States Department of Agriculture, and with a special committee representing this association, for the purpose of considering certain phases of the agricultural situation at the present time. As the result of that conference, the Secretary of Agriculture has offered to undertake the collection of certain information which will be of much value to all who are interested in agricultural matters and to make it available at an early date.

(6) The continued issuance of all the periodicals of the United States Department of Agriculture depends upon special Congressional action. The Secretary of Agriculture has submitted a list of periodicals, the continuance of which he deems important. It is suggested that this organization should express itself especially in favor of the continued publication of the Journal of Agricultural Research and Experiment Station Record. The Executive Committee will be pleased to take that matter up aggressively if it is the desire of the association.

On motion, the Executive Committee was instructed to stress the

matter of the continued publication of these two periodicals before the appropriate Congressional committee.

(7) The Executive Body at a meeting yesterday approved the report of the Committee on College Organization and Policy (see p. 277) in so far as it referred to the business affairs of the institutions. The recommendations made by the committee were referred back for further study and recommendation.

#### MILITARY TRAINING IN LAND-GRANT COLLEGES

**THE PRESIDENT.** It will now be a great pleasure to hear from Colonel Morrow of the War Department on matters of mutual interest to the colleges and the War Department.

**COLONEL F. J. MORROW.** It is a very great pleasure to have this opportunity to meet with this convention. I have met with you in the two previous years, and I begin to feel as though I were a member of the Association of Land-Grant Colleges.

In coming before you I am not so anxious to talk as to receive your views, because the R. O. T. C. is a cooperative activity in which the institutions and the War Department are partners. My remarks will be brief as I hope that they will arouse a discussion in order that I may have the benefit of your suggestions for the improvement of the military training in your institutions.

During the past year, while making the inspection of colleges, I urged the creation of standing military committees in the institutions—due to the fact that the presidents are very busy men and cannot give the necessary time to the details of R. O. T. C. administration. Some institutions have created military committees, made up of three to seven members of the faculty, to whom the professor of military science and tactics can go for advice and direction. These committees also suggest and initiate measures of importance for the military department. It is a very great source of strength to the army officers by giving them opportunity to talk with those who have an intimate knowledge of collegiate conditions. I would be pleased if you would take that under consideration.

During the last year the summer camps were successful. There were some 6,300 students in attendance and the accomplishments were quite worth while. We tried to make them entertaining as well as instructive to the students in order that they would be popular. The youngsters had in most cases come from long distances, from different sections of our country, and were able to utilize their week-ends to good advantage in sight-seeing. The college authorities can feel safe in encouraging the students to attend next year's camp and such support from them will be invaluable to the officers in charge of the units.

Seventy-five college men were sent to the National rifle matches at Camp Perry, Ohio, from the R. O. T. C. camps where they came in competition with the best rifle shots of our country, military and civilian. It is a source of gratification that the students did so well in the various matches in which they participated for they were the youngest group of competitors. The R. O. T. C. team from the Pacific Coast won the Soldiers of Marathon Trophy standing 17 among 65 competing teams.

The Norwich University team in the Regimental Team Match stood three, surpassing among others five teams of the Regular Army and 15 from the National Guard.

It is thought by the War Department that rifle shooting is a very important part of military training, and that it ought to be fostered by the institutions and the Government, for if we graduate American youth who are good rifle shots, we are already well advanced in preparedness. Rifle shooting should be on the basis of a sport and be a feature in college meets. Whatever you can do to foster it at the institutions through the school year will be of real assistance.

With regard to bonding I am anxious to learn what your experience has been during the past year. I have heard from various sources that many feel that it is unduly burdensome. When the War Department can get definite recommendation from the institutions the subject will be given serious consideration. You can of course approach Congress yourselves in this matter to secure such modification of the law as you believe just and proper.

There has been some change in the past year in the administration of the R. O. T. C. The departments have been superseded by Corps Areas whose Commanders are in direct supervision of the units in your colleges. I suggest that you make the acquaintance of those officers and invite them to your institutions. It will be mutually beneficial. The War Department still exercises general control over the conduct and operation of the R. O. T. C. as heretofore, but a large proportion of administration has been delegated to the Corps Area Commanders who are assisted by R. O. T. C. inspecting officers. You will find that these latter officers are in most cases those who visited your units from the Department Headquarters.

In the matter of the detail and relief of officers there may have been some disturbance because of these changes in the administrative machinery, but we are endeavoring to maintain the policy of having no changes in the army personnel through the school year. The War Department still believes in the wisdom of such a policy, but it is difficult to always observe it. I would like to know if you consider it essential that the college authorities should invariably be considered in the detail and relief of officers, especially the subordinate officers.

I recall the remarks of one of the leaders of your association, President Thompson of Ohio State University, two years ago at Baltimore on the need of better fitting uniforms. Those views were seriously considered, and as a result there has been put into effect a liberal and comprehensive system for the payment of commutation to those institutions which prefer to furnish the uniforms. Many institutions are now providing uniforms for their students under this system, and have created distinctive styles which are tailor-made and decidedly smart looking.

The courses of instruction for the various types of units have been so rewritten and modified for this year as to make them more valuable from an educational standpoint and more interesting and progressive for the students. I am not going into the details of these courses but would remind you that in their improvement from time to time we should have the assistance of your faculty members. In this and allied matters our officers desire your cooperative support.

The army personnel at your institutions is of much concern to you and



I am pleased to state that the provision of the army reorganization law places the R. O. T. C. on a better basis in that regard. Seven hundred officers and 1,924 enlisted men are now allotted for this work. Before the World War there were only 300 officers authorized. Some 468 are now assigned to units and I trust that this number will be raised to 500 before the end of the current school year. We cannot hope for more this year because the army has not yet been able to obtain all the personnel which the law provided for it, but the R. O. T. C. has its just proportion.

Three hundred and seventeen units are now organized in 239 institutions with an approximate enrollment of 100,000 students. The valuation of the equipment issued these units is about \$30,000,000. The Government would not make such liberal provision for this work if it did not regard the R. O. T. C. as an important feature of the system of procurement of Reserve Officers.

There is one problem which the experience of the past year proves to be vital, viz., the entrance of the eligible R. O. T. C. graduates into the Reserve Corps as officers. Remember, that in the first two years in college the young man is in the basic course. Upon completing this course he has the option of continuing his military training for two more years by entering the advanced course. During these last two years he receives approximately \$16 per month but must attend a six weeks' camp for which he is paid one dollar per day. Upon graduation, he is eligible for a commission in the Reserve Corps but again he has the option of choice and may enter the Reserve Corps or not as he elects.

The enrollment this year in the advanced course is some 49 per cent greater than last year, being 5,404, but nevertheless the number of students dropping out of the R. O. T. C. at the end of the basic course is disproportionately large. Exact figures are not available, but probably less than one-third of the eligible juniors in college this year entered the advanced course.

Some 1,500 seniors graduated from the R. O. T. C. in 1920 but less than 200 applied for commissions in the Reserve Corps. These figures are estimates.

Of course we know that there is a general lack of understanding at the present time as to what the Officers' Reserve Corps will demand of its members, which deters many from now entering it, but this will be cleared up in another year, and then the number of entrants will be of great concern.

What is the reason that more juniors do not enter the advanced course and why have not more eligible graduates applied for commission? During the past two years the War Department has made an earnest effort to establish and maintain an intimate contact with the educational institutions so as to ensure the most sympathetic and enlightened direction of R. O. T. C. affairs. I feel at times as though the institutional authorities do not respond to the War Department's efforts for cooperative direction as fully as their interests warrant. It is desirable, even necessary, that the R. O. T. C. should be so developed as to be thoroughly harmonious with the collegiate life and to supplement it to the satisfaction and advantage of the institution and the students. The likelihood of this being realized will be greater if the heads of your universities and colleges take an active part in guiding the development of the R. O. T. C. system.

During the past year the War Department called two meetings of educators to discuss concrete problems of policy and administration. These meetings were mutually instructive and helpful.

Is it not desirable that your annual conventions should include a section devoted to the discussion of your R. O. T. C. problems? Officers of the War Department should be present. Full time would be available for a thorough exchange of ideas which is not possible under present conditions.

If certain members of your association are designated well in advance of the convention date to investigate particular problems, to collect the views of others and present the matter to the convention, will it not have a stimulating effect that will be beneficial to your institutions and the R. O. T. C.?

What the R. O. T. C. is today is not vital but what it may become in the years to follow will be of the greatest importance in the maintenance of the Organized Reserves in our country so it is essential that we now start it wisely.

**THE PRESIDENT.** The presentation of military matters from the War Department would not be complete without a word from Dr. Mann.

**C. R. MANN.** There is just one thing in reference to the R. O. T. C. that I would like to point out. The situation is now very different from what it was three years ago. All legislation during the war and all the activities of the War Department were then directed towards the perfection of the military organization. Since the war the army's own conception of its function, now embodied in legislation, is that the army and the War Department must not only maintain a military organization that is fit to fight at any minute, but they must also maintain such cooperative relations with civilian institutions as will make possible a complete and immediate mobilization for any emergency. This larger conception, namely, that we are not maintaining merely a combat army, but a machine for rapid mobilization, changes the aspect of the problem, and makes it obvious that the War Department and the army cannot carry out this larger mission without the cooperation of all kinds of civilian agencies, educational institutions in particular. This is the first point. The conceptions of the purposes and functions of the army and of military training are now changed to include the idea of mobilization.

Legislation was enacted in the Army Reorganization Act last June which embodies this idea. The army now consists of three parts. One is called the regular army, which is the army as we knew it before the war, but enlarged and with a new spirit. The second is the National Guard, and the third is the Organized Reserves. You are familiar with what the National Guard was, and the new guard serves much the same general purposes. The Organized Reserves will consist of men who are interested in national defense and ready to enroll in the organization, and be classified so that they will know where they belong in case of an emergency.

The training, then, that must be carried out under the new legislation involves not only the training of men for the regular army and the preparation of reserve officers whose commissions carry with them no definite assignment. The new statute provides for the assignment of reserve officers to organizations of reserves in their own territory. The

reserve commission, which is granted to the graduates of the R. O. T. C. thus gives the reserve officer a definite job, which was not so before. Now, reserve officers are to be called upon to take part in the organization of these reserves.

The problem of R. O. T. C. in colleges is therefore much larger in scope than it was before the war. Educational institutions must now look upon this training as a training for mobilization as well as for the organization of the regular army. I think you will all understand the difference when you recall the difficulties which the educational institutions went through during the war when they were brought into the scheme of mobilization overnight. It is now their opportunity to get in touch with the War Department so that an organization is created which is capable of securing rapid mobilization of educational institutions. If we had had such an organization before the war it would not have been necessary to develop the S. A. T. C. and other emergency measures. Therefore, in response to Colonel Morrow's request to point out how the War Department can encourage more seniors to enroll and take R. O. T. C. commissions, please think of it now, not as a contribution to immediate military necessity, but as a contribution to potential mobilization.

If you stop to think how illiteracy, physical unfitness, lack of technical skill, and lack of classification delay mobilization on a large scale you will see how the R. O. T. C. can assist in solving the problems presented by mobilization for another emergency. The War Department is ready and anxious to cooperate with you in building up a training organization which includes educational institutions and which will function in case of war to make possible a rapid expression of national strength in a fighting army. And when you have made this analysis, you will find that the things that must be done to assure an adequate expression of national strength for war are not different from those required to develop national strength for peace. A nation well organized for productive work is bound to be a strong nation for either peace or war.

On motion, the convention adjourned *sine die*.

## MINUTES OF THE SECTIONS

### SECTION OF AGRICULTURE—RESIDENT TEACHING

WEDNESDAY MORNING, OCTOBER 30, 1920

#### ELECTION OF OFFICERS

Since the Chicago meeting failed to provide for a set of officers for the Sub-section of Resident Teaching, officers were chosen as follows: *Chairman*, Alfred Vivian, Ohio State University; *Secretary*, C. D. Jarvis, United States Bureau of Education.

The first topic for discussion was "What should be the content of a four-year college curriculum in agriculture?" The following are abstracts of remarks on this subject by Dean Eugene Davenport, University of Illinois, Professor H. F. Cotterman, University of Maryland, and President W. M. Jardine, Kansas State Agricultural College.

#### THE REQUIRED FUNDAMENTAL COURSE IN SCIENCE, ENGLISH, ETC., FOR AGRICULTURAL STUDENTS

BY EUGENE DAVENPORT

Doctors are bound to differ as to the kind of chemistry, biology, English, etc., that ought to be taught to agricultural students, and it is only out of discussion and experience that we shall arrive at successful practice. Personally I believe that the fundamental character of some of these subjects has been vastly overestimated. Of course, English is fundamental as a means of expression. Some knowledge of science is fundamental because science deals with facts and their relations. This knowledge is fundamental not only because of the methods which it teaches but for the material.

The argument, however, that any particular branch of science is fundamental is largely invalidated by the fact that while chemistry has claimed precedence over all other fundamental subjects, yet it is probably physiology rather than any other single branch that is most fundamental to agricultural processes. Yet the word is seldom heard, even in educational discussions, all of which shows that we are only beginning in the development of science.

Because this is true, I am disposed strongly to combat the idea that any particular course of study in any particular science is absolutely fundamental. We have exploited chemistry tremendously, but we have not only neglected physiology but physics as well, and, until recently, economics. Any fair-minded inquirer will be forced to admit that what we teach at any particular time in any one of these subjects is extremely conventional, if not indeed largely personal.

For example, biological science began with the teaching of classification, proceeded from that to morphology, and is only beginning in the field of function. Because of this shifting phase of emphasis, we may as well

face the fact that no particular course of study and no particular branch of science can be regarded as *per se* and absolutely fundamental to education in agriculture or anything else.

What is strictly fundamental, in my opinion, is in the case of English, some knowledge of expression, and in the case of science, some knowledge of facts and the way to ascertain them, together with some knowledge of their connection, one with another, under what we like to call principles. Just which branch of science and which aspects within that branch are most valuable to our purposes is, of course, a large question.

The largest of all questions in this particular field, in my opinion, relates to the methods of instruction likely to be followed. Most of our troubles, I believe, arise from the fact that teachers in all these subjects are specialists, and they tend strongly to teach all their classes from the standpoint of the student who is to specialize in their particular field. We have not yet developed very much skill in outlining such a survey of each of these special fields as shall be most valuable to the general student not specializing in that particular field. This is why instruction in English and the sciences is most unsatisfactory to the vast majority of our students.

As to English, it seems to me, that the chief purpose is to cultivate a love for good literature on the part of the agricultural student and to inspire some knowledge of standards as to what constitutes good literature, together with a fair degree of instruction in simple composition.

In the sciences, it seems to me, we have yet to work out good elemental courses. The tendency is to drag too much of specialization into the beginning courses. Particularly is this true in chemistry, and it is probably inevitable during the beginning stages of these sciences that we should suffer much at this point.

One obvious relief is that these non-technical subjects should be taught in the college of agriculture, and with special reference to the needs of the agricultural student. There is no question but that this would secure great temporary relief. Personally I have always been opposed to short-circuiting our problem by this device, convenient as it would be. We would be better off by attempting to develop introductory courses common to all classes of students.

In making this criticism of the way in which our literary and scientific subjects are being taught, I must point to the fact that we in agriculture are also in danger of going to seed in specialization, which is probably the inevitable result of the developmental stage of the subject.

#### REQUIRED COURSES IN AGRICULTURAL SUBJECTS

By H. F. COTTERMAN

I have assumed that "required courses" as here used refer not to the quantitative prescriptions in agricultural subjects made by most colleges or to the various special courses that are required in such specialized curriculums as agronomy, soils, or horticulture but rather to the central core of agricultural subjects which are included in all of the agricultural curriculums of a college and which are required of all graduates regardless of their particular lines of specialization.

I did not feel able to open this discussion without making some investigation. I began with a study of Mr. Jarvis' work of 1918 published as Bureau of Education Bulletin 29. This is of interest to us in this particular instance in that it shows the wide variety of agricultural subjects required for the bachelor's degree in agriculture in the various institutions in the country. I also reviewed the report of the American Association for the Advancement of Agricultural Teaching for last year and certain parts of the recommendations of the Committee on Instruction in Agriculture of this association. Next, I made a study of college catalogs from 10 representative institutions, running back over the catalogs for four or five years in some cases. In addition to this I wrote to some 16 or 18 of my personal friends now working in agricultural institutions asking them for their opinion in regard to the number and nature of the courses in agricultural subjects that should be required in a four-year curriculum. About one-half of these men are engaged like myself in the training of teachers of agriculture and are known as agricultural education men, the other half are made up for the most part of men engaged in specialized subject-matter departments, and two are deans of agricultural colleges.

Briefly, I find that there seems to be a pretty general feeling that students who expect to be recommended for the bachelor's degree from an agricultural curriculum, should be required to take from one to two courses in each of the following departments: Farm crops, soils, horticulture, animal husbandry, dairying, farm equipment, and farm management, and in addition be required to present at least the equivalent of a year's practical experience on a farm. About half of the men name poultry as an additional subject in which a course should be required. Nearly all of the men felt that the work required from these departments should be general or basic in character conforming with the view that was expressed last year by the American Association for the Advancement of Agricultural Teaching. My own feeling, after making this study and with my experience both as a student and an adviser of students in agricultural institutions, is that 95 percent of the students who are recommended from agricultural curriculums should be required to take either one or two general courses in the subjects just mentioned; that the amount and names of these courses would depend in a great measure on the way in which an institution is organized, that is, whether an institution is organized on the term or semester plan, whether the courses are named generally or specifically, and on the usual weight of basic courses in the institution.

With the other five percent of students who come up for graduation from agricultural institutions it is hard to form an opinion of the requirements that should be laid down, because I find that in institutions generally there is no agreement as to what constitutes a curriculum in agriculture. In one institution forestry may not be considered an agricultural subject at all while in another it may be so considered and be administered under the same rules and regulations as are the other subjects in agricultural curriculums of the institution. In some institutions horticulture is not considered an agricultural curriculum while in others horticulture is one of the important agricultural curriculums. In the catalog of one institution, bio-chemistry is the first curriculum listed. It is questionable in my mind if we should require a student in forestry or

a student in bio-chemistry, for example, to take a course in poultry or farm equipment, but for the 95 percent of students who follow the usual curriculums in agriculture, I believe that either one or two general or basic courses in each of the subjects just mentioned should be required.

#### AMOUNT AND CHARACTER OF ELECTIVE COURSES IN A FOUR-YEAR AGRICULTURAL CURRICULUM

BY W. M. JARDINE

In determining the amount and character of electives in a four-year curriculum in agriculture, the material to be served and the object to be reached should be kept in mind. High school graduates are entering universities and colleges at a rather immature age, usually about 16 years. They are not old enough to know what occupation they intend to follow nor are they experienced enough to select subjects which will give them the fundamental training which should precede specialization.

It is my personal belief, and it is the plan we are following at the Kansas State Agricultural College, that the work of the freshman and sophomore years should be required and should embrace such basic subjects as English, chemistry, biology, including botany and zoology, and should contain one agricultural subject each semester. The agricultural subject should be offered to hold the interest of the student and to make him feel that he is studying agriculture. A course in soils and in soil fertility should be required in the sophomore year for all agricultural students. In this course, principles should be taught.

After a student has spent two years in college and has reached the age of 18 or 20 he will be in a better position to decide what line of agricultural activity he wishes to follow and he will know better what subjects he should select to prepare himself for that work. I am, therefore, in favor of including in the junior and senior years a large percentage of electives; in fact, I would make the work of these two years mainly elective. The character of the electives will be determined by the objective sought. Some will wish to become livestock farmers, dairy farmers, or fruit farmers; others will wish to become teachers, investigators, or extension workers. The animal husbandryman will wish to take the animal husbandry group of electives which in the main should be composed of animal husbandry subjects or subjects closely relating to animal production. An animal husbandryman should also take a course in forage crops because he will be required to grow forage for his animals. He may not wish it, nor would it be desirable, perhaps, for him to study horticulture or poultry husbandry. He probably could use his time to better advantage by taking advanced work in beef production, sheep, hog, and horse production. Likewise, the man who is going into horticulture will not wish to spend much time in studying livestock.

Students should be counselled, if not required, to spend a certain amount of time in studying humanistic subjects such as rural sociology and agricultural economics, the amount elected to depend upon the amount required in their fields of work.

The young man who expects to become a teacher of agriculture in a rural high school, for example, should elect 10 or 15 hours of work in educational subjects, but the young man who is going to be a farmer

ought not to spend much time on such subjects. He had better elect more agricultural subjects and perhaps take additional work in agricultural journalism and debate or public speaking. An agricultural graduate skilled in these subjects will be a more valuable citizen as well as a more efficient leader.

I am not in favor of what would be considered free electives, that is, to permit a student to select whatever he wishes without counsel. Only a small percentage of the last two years' work should be absolutely free choice. Other electives should be chosen with the aid and approval of the department heads in whose departments the major and minor subjects are taken. Otherwise, selection likely will be made to very little purpose. There will be a tendency for students to pick out easy subjects. At the Kansas State Agricultural College, all of the first two years' work is required. The curriculum in agriculture is divided as follows:

Total required in agriculture (prescribed and elective) . . .	64 semester hours
Total allowed in non-agriculture (prescribed and elective) . . .	67 semester hours
Required in military science . . . . .	4 semester hours

Total required for graduation . . . . .	135 semester hours
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The above can be further subdivided as follows:

Prescribed in agriculture . . . . .	43 semester hours
Prescribed in non-agriculture . . . . .	45 semester hours
Prescribed in military science . . . . .	4 semester hours

Total prescribed . . . . .	92 semester hours
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Electives in agriculture . . . . .	21 semester hours
Electives in non-agriculture . . . . .	6 semester hours
Electives which may be in agriculture or non-agriculture . . . . .	16 semester hours

Total electives . . . . .	43 semester hours
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Total required for graduation . . . . .	135 semester hours
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In building up a curriculum the fact that we are first of all training for citizenship must be borne in mind. Most specialization should come after the completion of a four-year course in college, but on the other hand, if the selection of subjects in any way is properly made at the proper time, there is no reason why we should not be able to train a young man to become a first-class farmer and a first-class citizen, whether he be an animal husbandry farmer, a crop farmer, a horticulturist, or a county agent. We also can make fairly good progress toward training a teacher of agriculture although in my judgment, teachers of agriculture should be encouraged to continue their training after receiving their bachelor of science degree. Of course, the man who expects to become an investigator or a college teacher should pursue his studies further after receiving his B. S. degree.

At least a minimum of one-third of the time devoted to an agricultural course should be given to elective subjects which in the main should be chosen under supervision.

The chairman called attention to the progress that has been made at Ohio State University by way of making the instruction in mathematics for agricultural students more concrete. The professor of mathematics



interviewed the several agricultural instructors and obtained from them a list of problems in which mathematics may be developed. On the basis of the information obtained in this way a three-hour course in agricultural mathematics has been worked out for students in agriculture.

President K. L. Butterfield, Massachusetts Agricultural College, stated that the great problems of today are sociological and economic and therefore he believed that social science should be regarded as fundamental in any college curriculum.

Professor J. S. Chamberlain, Massachusetts Agricultural College, stated that the chemists are desirous of making the chemistry courses more effective. At Massachusetts Agricultural College, he stated, the fundamental work in chemistry is given in one semester and that it is taken by all students, whether they intend to specialize in chemistry or in agriculture.

Dean Davenport reminded the audience that the teachers in secondary schools are the product of the colleges and that they are inclined to teach the same way they were taught in college. If the college student does not receive real elementary instruction, the chances are that the students in the secondary school under his instruction will not receive the proper kind of training. The real problem, he said, is to find out what are the fundamentals and then to get men to teach them.

President W. H. S. Demarest, State University of New Jersey, called attention to the obvious fact that teaching should be done from the standpoint of the student. He also stated that if the secondary schools should turn out students with a knowledge of the fundamental sciences more time could be given to the higher courses in the colleges.

President A. H. Upham, University of Idaho, stated that in justice to the teachers of English in the colleges it should be said that they are spending considerable time in correcting the faults of the students and at the same time trying to introduce more concrete subject matter in the instruction in composition.

President A. F. Woods, University of Maryland, emphasized the importance of giving more attention to courses in economics and sociology and thought that such work should be required.

The question of credit for normal school courses in agriculture was discussed by Dean F. B. Mumford, University of Missouri, as follows:

#### ACCREDITING AGRICULTURE FROM THE NORMAL SCHOOLS

BY F. B. MUMFORD

The widespread introduction of agriculture into the curriculum of high schools has brought about a situation which has an immediate importance to the colleges of agriculture. This movement affects the policies of the colleges of agriculture in two important particulars:

(a) The teaching of elementary agriculture in the high school has made it possible for the colleges to eliminate much of the very elementary

material formerly included in the curriculum and to offer more advanced courses in practically every technical agricultural subject. This process is not yet complete since the college must still continue to provide for students who have had no agriculture in high school.

(b) The demand for teachers of agriculture has caused a large number of normal schools to establish departments of agriculture and offer courses in this subject. Sooner or later every college of agriculture is called upon to accredit this work and accept it for the degree in agriculture.

This development of agricultural departments in normal schools has been very rapid since the passage of the Smith-Hughes law providing Federal funds for the training of teachers. Not many normal schools have received Federal aid for this work, but their recent enterprise in developing agricultural instruction indicates a hope that they may yet be approved for this work.

It is true that practically all normal schools admit students who have not sufficient preparation to make them acceptable candidates for college work in a standard university. A large proportion of the students in some normal schools are registered in the sub-freshman or non-collegiate section.

It is also true that in many normal schools there are well organized subjects which are of college grade and are accepted by standard colleges as equivalent to similar courses in the university. In this discussion it should be understood that the references are all to such courses in agriculture as are given in the college section and are regarded by the normal schools themselves as distinctly of college grade. It may be said in the very beginning that no college of agriculture can afford to give credit toward a degree for agriculture in normal schools taught to students registered in the non-collegiate section. With this understanding of the problem we may proceed to a discussion of the question of accrediting agriculture from normal schools and institutions of similar rank.

What policy shall the colleges of agriculture adopt in reference to the credits in agriculture which are offered in partial fulfillment for the degree? Manifestly, if these credits are equivalent to those of the college of agriculture they should be accepted without question. If they are not equivalent they should not be accepted at their face value.

In my opinion the courses in technical or vocational agriculture offered by the normal schools and State teachers' colleges are not and cannot from the very nature of things be equivalent to similar courses given in the college of agriculture and for the following reasons:

(1) The State teachers' colleges and normal schools are not equipped with laboratories, libraries, livestock, fruit orchards, dairies, creameries, farm machinery, land, and other equipment which we all know is essential to good teaching in agriculture.

(2) The very specialized courses in the college of agriculture are in charge of specialists. It is often the case that within a single department the subject matter is so divided that it is taught by several specialists, each in charge of a single division of the subject. In the normal schools one or at most two professors of agriculture with little or no equipment, teach the whole range of subject matter. In one institution the

plant industry courses are taught by the professor of science and the animal husbandry courses by the professor of extension.

(3) The highly efficient teaching of the colleges of agriculture is in a sense based on the investigational work in progress in the experiment station. The educational value of the close dependence of good teaching on a program of continuing fundamental research is well recognized. The normal schools have no experiment station and no program of research to vitalize agricultural teaching.

(4) The teaching in the colleges of agriculture is greatly influenced by the close contact the institution has with the vocation of agriculture through the agricultural extension service. The colleges are in daily close contact with the actual business of farming and the instruction, therefore, is continually revised and improved and made more practical and efficient through this relation.

Some of the administrators of the State normal schools have admitted that the normal schools could not hope to give more advanced subjects in technical agriculture, but were in a position to give such elementary subjects as poultry husbandry, dairy husbandry, animal husbandry, and field crops, as efficiently as the college of agriculture. In answer to this it may be said that in a sense the colleges of agriculture no longer give elementary courses in these subjects. Those which are now elementary only in degree will be advanced in the very near future. It is worth while, perhaps, to take one example to illustrate the fundamental facts on which the policies of the college of agriculture are based.

It has been suggested that the normal schools might teach the elementary courses in poultry husbandry in such a way as to be fully equivalent to the courses offered by the colleges of agriculture. Such an opinion fails to recognize the exceptional advantage and the essential difference resulting from specialization in subject matter and extensive equipment in a vocational subject. The instructor in poultry husbandry in the college of agriculture has no other subject-matter interest. He teaches only poultry, he carries forward continuous research in poultry husbandry methods. He spends hours every day in the poultry yard. He has hundreds of birds, numbers of poultry houses of varying types, and a library complete in its collection of everything published on poultry husbandry. The State normal schools cannot possibly give equivalent courses in poultry husbandry until they have the same equipment, employ a specialist devoting his whole time to this subject who also has the advantage of continuous research and relation to the poultry industry through extension services. The same principle applies in the teaching of animal husbandry, horticulture, dairy husbandry, field crops, soils, and in all other subject-matter divisions in the college of agriculture.

Agriculture is a professional subject. The acceptance of credits in agriculture cannot be determined on the same basis as credits in history, English, modern language, or other conventional subjects. The correctness and thoroughness of agricultural teaching may influence the agricultural practice of a commonwealth. Incorrect or careless teaching may cause great economic loss to a whole State.

No such result is likely to follow inaccurate teaching in English or Latin. The world might continue to live and thrive even if a whole class

in a normal school were taught an incorrect form of Latin verb or even an improper English construction.

We do not encourage the teaching of law, engineering, or medicine in normal schools. We cannot afford to risk the acquirement of strictly professional training to any but strictly professional schools. We do encourage teaching sciences which are accepted in fulfillment of science requirements in degree courses for medicine and engineering. Similarly, credits in science, mathematics and English from normal schools should be accepted when taught to properly trained students of college rank in institutions of recognized standing.

It must be admitted that the agriculture taught in some normal schools is worthy of recognition. The problem is one of equivalency of work. Shall a three-hour course given in a semester (16 weeks) period in a normal school be credited three semester hours in a college of agriculture? If such credit is accepted at par, how shall it be applied? If not accepted at par, what value if any shall be given? Is it possible to establish general principles which may be accepted as a basis for uniform procedure by all colleges of agriculture in the acceptance of technical, agricultural electives? It cannot, as I have already indicated, be recognized as equivalent to the agriculture taught in colleges of agriculture. We must therefore arrive at some decision as to the amount of credit and the manner of applying this credit when accepting such work in partial fulfillment for the degree in agriculture.

The requirements for the degree in most institutions include certain prescribed subjects and permit a certain amount of election. It is my opinion that in no case should the subjects accredited for normal school agriculture be accepted for prescribed courses. They should only be accepted for the elective work. It is also my opinion that for the reasons given this work is not fully equivalent to the work in the college of agriculture and should therefore be accepted for partial credit only. I would suggest that from 50 to 65 percent of the face value of the credit in agriculture be accepted. It is true that this particular amount is somewhat arbitrary, but there seems to be no other method of arriving at a just estimate of this work.

WEDNESDAY AFTERNOON, OCTOBER 20, 1920

The session opened with a report of the Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts, presented by A. C. True, States Relations Service, United States Department of Agriculture

#### REPORT OF COMMITTEE ON INSTRUCTION IN AGRICULTURE, HOME ECONOMICS, AND MECHANIC ARTS

##### IMPROVEMENT OF COLLEGE TEACHING IN VOCATIONAL SUBJECTS

In making this study on the improvement of college teaching in vocational subjects, the Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts sent to the presidents of all land-grant colleges two sets of questions, one for the attention of the president and another for each member of the vocational teaching staff, that is, the teachers of

agriculture, home economics and mechanic arts or engineering. About 2,200 questionnaires were sent out.

The blanks sent to presidents contained 14 questions relating to the policy of the institution with reference to minimum qualifications for the initial appointment of vocational instructors, assistant professors, associate professors, and professors; means employed for following the work of teachers and encouraging improvement in methods of teaching; and the relations of resident teaching to research, extension, vocational practice and outside employment for these teachers.

Each blank sent to members of the teaching staffs contained 14 questions, four of which related to their qualifications as to academic, technical and professional training, their teaching experience and the number of subjects they are now teaching; 6 to methods of teaching, difficulties in doing good teaching, and measures of success in teaching; and 4 to bases for the promotion of teachers and relations of resident teaching to research, extension and outside employment. Eight hundred twelve questionnaires were returned, most of them with fairly complete replies. Of these 31 were from presidents or deans, 396 from teachers of agriculture, 111 from teachers of home economics, 221 from teachers of engineering or of mechanic arts and 53 from teachers of professional courses in education. There were also many returns from teachers of related science but these were not considered a part of this study and were omitted from the tabulations.

The tabulation and analysis of these replies was a much larger task than the committee had anticipated. All of the replies received prior to August 1 have been tabulated but there has not been time for adequate study of the tables by the members of the sub-committees nor time to formulate recommendations on all phases of the study. The committee has, therefore, decided to make a progress report on the first four questions relating to the qualifications of teachers and their present status in the institution, and to continue for another year the study on other phases of the inquiry. In the preparation of this twenty-third report of the committee, Professor D. J. Crosby as secretary has assisted in preparing questionnaires and has had charge of the tabulation of replies.

#### THE PRESENT QUALIFICATIONS OF COLLEGE TEACHERS AND THEIR TEACHING BURDEN

*Academic degrees.* The academic standards for the appointment of instructors vary somewhat, but 84 percent of the replies from college presidents indicate the bachelor's degree as the minimum. Some of the presidents frankly admit that under present conditions standards have broken down, but they consider this a somewhat temporary disaster. Returns sent in by instructors show that nearly 19 percent of them have no college degrees, while only 14 percent have a second degree. Most of the instructors who have no degrees are teachers in engineering colleges or departments, where the practical qualifications for shop instructors and the salaries paid by the trades make it difficult to get men with the amount of technical training necessary for a degree.

For appointment to the higher positions—assistant professors, associate professors and professors—there are no uniform standards. Admin-

istrative officers are seeking men and women with the higher degrees but 62 percent of assistant professors have not gone higher than the bachelor's degree. The same is true of 56 percent of associate professors and 53 percent of professors. The doctorate is held by 8.8 percent of the teachers in agriculture, 1.8 percent of the teachers of home economics, 5.5 percent of the teachers of engineering and 15 percent of the teachers in departments of vocational education.

It is the opinion of the committee that the land-grant colleges should set higher academic standards for vocational teachers and that the present unsatisfactory conditions should be regarded as temporary. As contributing to higher standards we recommend:

(1) That candidates for the position of instructor be carefully considered not only with reference to their academic and technical training but also with reference to their capacity for growth—that none be appointed who are not potential full professors.

(2) That appointments to the position of instructor be considered purely temporary; and that candidates be given to understand that their appointment lays no obligation upon the institution to carry them on the rolls beyond the period of appointment or to promote them to a higher rank.

(3) That the period of employment as instructor be clearly defined as a time of trial and opportunity for graduate study and that those who do not show capacity for growth and ability in graduate work be dropped.

(4) That no one with rank below that of assistant professor be made wholly responsible for the organization and administration of a college course.

(5) That the colleges pursue a liberal policy in making arrangements for instructors to do part-time graduate work and in granting leave for graduate study.

(6) That the salaries of resident teachers be raised.

*Technical training* equivalent to graduation from a land-grant college is required of practically all instructors in vocational subjects. In addition, 20 percent of the colleges require some specialization in the subjects to be taught. Technical training seems not to be the weakest point in resident teaching.

*Professional training.* There is no longer serious question as to the value of professional training in such subjects as educational psychology and methods of teaching. Presidents and deans are beginning consciously to seek for teachers with such training. Forty-nine percent of the teachers replying to the questions concerning their professional training have studied one or more subjects in education and less than 9 percent of these fail to give definite values to such studies. Many of them analyze clearly the benefits they have derived.

There are a few eminent educators in this Association of Land-Grant Colleges who believe that the quality of teaching in high schools is better than much of that in our colleges. If this be true it is due, not to the superior academic or technical training of the high school teachers but to their better professional training and to supervision.

The committee therefore makes the following recommendations:

(1) That the colleges encourage students who hope to become college teachers to take courses in education.

(2) That they insist upon graduate study, including courses in education, for appointment to any position higher than that of instructor. In engineering professional experience should be included.

(3) That college instructors doing graduate work to prepare for teaching be urged to take work in education designed for college teachers, including methods of teaching, college organization, and supervised teaching.

(4) That the colleges provide for the improvement of college teachers in service by bringing in outside lecturers and arranging for conferences or seminars among teachers to discuss methods of teaching.

*Teaching Experience.* Definite standards are not fixed nor would they be easy to fix, for the teaching experience necessary for promotion from the position of instructor to that of assistant professor and so on up to the full professorship. Conditions differ somewhat with institutions and positions but more with individuals as their native ability, their previous training, their resourcefulness and adaptability, and their love for the work.

The committee makes no recommendations except that each position be made a period of testing for a higher position, and that experience be measured by success rather than by length of years. The factors to be considered in making promotions will be discussed in a later report.

*Numbers of Subjects Carried by Teachers.* The question to individual teachers concerning their experience called for an enumeration of subjects taught. From 764 replies an attempt has been made to show in a comparative way the number of subjects teachers are now carrying. The results are rather surprising. Almost 60 percent of all teachers confine their work to one subject like poultry husbandry, or nutrition, or machine design, and less than 12 percent are teaching more than two subjects.

Tables given in the appendix of this report show that the teachers of home economics and of courses in education are carrying more subjects than those in the older subject-matter groups—agriculture and engineering.

We believe that the tendency to reduce the number of subjects taught by each teacher should be encouraged, and that in many institutions there should be a reduction in the number of hours a week that a teacher may be required or permitted to teach. Many of the teachers mention lack of time for preparation as one of the chief difficulties in doing good teaching.

*Vocational Experience.* Vocational experience in relation to subject matter is definitely required by nearly 50 percent of the land-grant colleges that furnished replies to the committee's questionnaire. It is considered desirable by an added 26 percent. Relatively few of the colleges have definite or fixed requirements, and none so far as we know have made any serious attempt to standardize values as between different types of experience or to establish measurements of vocational experience. For example, what shall be said of the relative value of professional engineering experience for a teacher in mechanical engineering; of shop experience for shop instructors; of being farm reared or city bred with two or more years of farm experience for the teacher of agriculture; of experience in making clothes on the family sewing machine or in a dressmaking shop for the teacher of clothing?

Nobody yet is prepared to answer these questions, but they are coming to be of sufficient importance to warrant careful study with a view to developing standards and measurements of the values of vocational experience.

These summary statements and the recommendations of the committee are based on more detailed discussions and tables given in an appendix for the convenience of those who wish to give further study to the questions under discussion.

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EDNA N. WHITE,  
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*Committee.*

#### APPENDIX

##### MINIMUM QUALIFICATIONS SOUGHT IN THE INITIAL APPOINTMENT OF VOCATIONAL TEACHERS.

*Academic degrees.* A large percentage of the presidents of land-grant colleges (84 percent of replies) indicated college graduation, usually from a technical college, as the minimum qualification for the appointment of instructors in these institutions. On the other hand, 16 percent say in effect that a college degree is not necessary or that they have no definitely formulated minimum qualifications for instructors. The institutions in the following States may be included in this category: Minnesota, New Mexico, New York (mechanic arts), South Carolina and West Virginia. An examination of the questionnaires from instructors in these same institutions and a careful study of replies to other questions from the presidents of these colleges show that even in these institutions the appointment of instructors without bachelor's degrees is the exception rather than the rule, or that the condition indicated is regarded as an emergency soon to be overcome. Both Sibley College of Cornell University and the College of Engineering of the University of West Virginia indicated that instructors in shop-work are practically the only ones who may be appointed without technical training equivalent to a bachelor's degree.

The difficulties that some of the colleges now encounter in attempting to adhere to fixed standards are indicated by the following quotations:

"Because of the recent development of most of vocational teaching and the competition of industrial demands for men and women trained in vocational branches, it is impossible to set up or to maintain standards of qualifications for these positions. It is simply a case of 'get the best you can' for each individual position."—Minnesota.

"In these days of high-priced living and low salaries, we seek the highest qualifications we can get for the money we can offer."—New Mexico.

Returns sent in by instructors show that 18.8 percent of them have no college degrees, 67.1 percent have the bachelor's degree as the highest, and 14.1 percent the master's degree as the highest. None of the instructors sending in returns has the doctor's degree.

In the case of assistant professors, 11 of the presidents (35.5 per-



cent) indicated the bachelor's degree as the minimum and 6 (19.3 percent) the master's degree as the minimum. One other president indicated the bachelor's degree as a "desirable minimum", 13 (42 percent) the master's degree as desirable and 5 (16 percent) the doctor's degree as desirable. The individual records show 3.9 percent of assistant professors without and degrees, 57.9 percent with bachelor's degrees, 33.1 percent with master's degrees, and 5.1 percent with the doctorate.

For the position of associate professor 7 of the presidents (22.6 percent) indicated the bachelor's degree as the minimum and 5 (16 percent) the master's degree. Eleven others (35.5 percent) indicated the master's degree as desirable and 6 (19.3 percent) the doctor's degree as desirable. The actual academic rating of associate professors is not much higher than that of assistant professors, as indicated by the following percentages holding each academic degree: No degrees 2.7 percent, bachelor's degrees 53.6 percent, master's degrees 40 percent, doctor's degrees 3.7 percent.

For the full professorship, only 4 presidents (13 percent) indicated that they would accept the bachelor's degree as the minimum and 6 (19.3 percent) the master's degree. Only one institution (3.2 percent), however, indicated the doctor's degree as the minimum, although 16 (51.6 percent) indicated it as very desirable. Nine presidents (29 percent) indicated the master's degree as the minimum for the full professorship.

The records from 341 professors show that 4.7 percent of them are without degrees; 48.6 percent have bachelor's degrees only; 33.9 percent have master's degrees and 12.8 percent hold the doctorate. Some of the administrative officers indicated that the minimum academic qualifications vary with different departments in the institution. An examination of tables made up from replies from individual teachers indicates that there is considerable variation in qualifications and that to some extent, these variations follow subject-matter lines.

Taking all of the teachers without degrees, we find that 2.8 percent of them are in agriculture, 7.3 percent in home economics, 14.6 percent in mechanic arts and 5.6 percent in departments of vocational education.

At the other end of the academic ladder we find that of the teachers holding the doctorate, 8.8 percent are in agriculture, 1.8 percent in home economics, 5.5 percent in mechanic arts and 15.1 percent in departments of vocational education. The accompanying tables (1 to 4) show these relationships arranged in one case by subject matter and in another by grades in the teaching staffs.

TABLE 1—PERCENTAGE OF COLLEGE TEACHERS  
WITHOUT DEGREES

By subject matter	Percent	By grades	Percent
Agriculture	2.8	Instructors	18.8
Home economics	7.3	Assistant professors	3.9
Mechanic arts	14.6	Associate professors	2.7
Education	5.6	Professors	4.7

TABLE 2—PERCENTAGE OF COLLEGE TEACHERS  
WITH BACHELOR'S DEGREE AS HIGHEST DEGREE

By subject matter	Percent	By grades	Percent
Agriculture	48.	Instructors	67.1
Home economics	70.	Assistant professors	57.9
Mechanic arts	61.2	Associate professors	53.6
Education	49.1	Professors	48.6

TABLE 3—PERCENTAGE OF COLLEGE TEACHERS  
WITH MASTER'S DEGREE AS HIGHEST DEGREE

By subject matter	Percent	By grades	Percent
Agriculture	40.4	Instructors	14.1
Home economics	20.9	Assistant professors	33.1
Mechanic arts	18.7	Associate professors	40.
Education	30.1	Professors	33.9

TABLE 4—PERCENTAGE OF COLLEGE TEACHERS  
WITH DOCTORATE

By subject matter	Percent	By grades	Percent
Agriculture	8.8	Instructors	0.0
Home economics	1.8	Assistant professors	5.1
Mechanic arts	5.5	Associate professors	3.7
Education	15.1	Professors	12.8

*Technical training.* Practically all of the institutions from which replies were received require technical training equivalent to graduation from a land-grant college for appointments to the rank of instructor. Twenty of the replies (64.5 percent) specify graduation and in addition, 7 (20.6 percent) specify specialization in the subject to be taught. Among other replies, 2 indicated "knowledge of subject" and 5 indicated no specific requirements. One institution indicates that "it depends on the department".

For appointment to the position of assistant professor, 9 of the institutions (29 percent) indicated the necessity for additional technical training or graduate work. For the position of associate professor, 10 (32.3 percent) specify additional graduate work, and for the position of professor, 12 (38.7 percent) specify graduate work.

*Professional training.* About one-fourth of the institutions sending in questionnaires indicated through their presidents or deans, an appreciation of training in professional education. One-third of the institutions heard from failed to answer this question, so that it is difficult to judge of their attitude. Taking 21 answers as the basis for computing percentages, 8 institutions (38 percent) replied that professional training is sought in the appointment of instructors, and 3 of these institutions specify the minimum semester hours—Oklahoma, 6 hours; South Dakota, 12 hours; West Virginia, 10 hours. One additional institution replied that professional training is insisted upon in some departments. Seven institutions apparently give no consideration to this, or, at least, they have no fixed requirements in the appointment of instructors. The remaining 6 institutions returned answers which indicated that they misunderstood the question or the term "professional training".

For the more advanced positions, the requirements for professional training are practically the same as for instructors. The only case where a different requirement is made for different vocations is that of Kentucky, which returned no answer in the case of instructors in agriculture and mechanic arts, but specified "work in special methods" for instructors in home economics. Table 5 shows the percentage of teachers who have studied courses in professional education and the number of courses studied.

TABLE 5—PERCENTAGE OF TEACHERS WHO HAVE STUDIED COURSES IN PROFESSIONAL EDUCATION AND NUMBER OF COURSES STUDIED

BY SUBJECT MATTER	NUMBER OF COURSES					More than 5	Studied in normal school or by self
	1	2	3	4	5		
Agriculture	10.6	4.	4.6	2.8	2.	1.2	5.6
Home economics	10.9	18.2	6.3	19.1	11.8	20.9	—
Mechanic arts	6.4	4.2	3.6	—	—	—	13.6
Education	—	8.3	12.5	16.6	16.7	45.8	—

BY GRADES	NUMBER OF COURSES					More than 5	Studied in normal school or by self
	1	2	3	4	5		
Instructors	10.2	10.2	4.2	7.6	5.1	6.	1.7
Assistant professors	8.8	6.3	10.7	6.3	3.1	8.8	3.8
Associate professors	11.8	6.8	4.9	3.9	4.9	6.8	2.9
Professors	9.1	9.1	2.	5.4	8.	10.4	10.7

In this connection, it is worthy of note that nearly 16 percent of the teachers of agriculture who replied to the question concerning professional studies replied in such a way as to indicate that they did not understand the meaning of the term, "professional education". The question or request was a perfectly simple one: "Give the names of the subjects in professional education that you have studied," but they gave instead lists of technical subjects that they had studied. The same is true of 8 percent of the teachers of home economics and 71 percent of the teachers of mechanic arts, so that a little more than 50 percent of all replies to this question from resident teachers were necessarily discarded.

An examination of the tabulated replies to this question shows that the teachers of home economics have given much more study to courses in professional education than those in either agriculture or mechanic arts. It is also noteworthy that more than 20 percent of the teachers of home economics have studied more than 5 courses in education, in other words, that they have made rather thorough preparation on the professional side of their work.

Table 6 shows the subjects in education that have been studied in college by each class of teachers.

TABLE 6—NAMES OF SUBJECTS IN PROFESSIONAL EDUCATION AND FREQUENCY OF OCCURRENCE

SUBJECTS	Number of occurrences				Percentages based on total replies in each class			
	Agr.	H.Ec.	M.A.	Ed.	Agr.	H.Ec.	M.A.	Ed.
Total answers	306	110	141	48				
Psychology or educational psychology	72	93	17	41	23.5	84.5	12.1	85.4
History of education	27	62	5	29	8.8	56.3	3.5	60.4
Principles of education	21	37	6	9	6.9	33.6	4.2	18.7
School organization	3	3	—	2	1.0	2.7	—	4.1
School administration	15	4	—	12	4.9	3.6	—	25.0
Vocational education	5	12	—	14	1.6	11.0	—	29.1
Agricultural (rural) education	30	—	—	11	9.8	—	—	21.9
Industrial education	—	5	3	3	—	4.5	2.1	6.1
Methods of teaching	29	23	7	10	9.5	20.9	5.0	20.8
Methods in agriculture	7	—	—	6	2.3	—	—	12.5
Methods in home economics	—	56	—	2	—	50.9	—	4.1
Philosophy of education	11	20	—	7	3.6	18.2	—	14.5
Child psychology	6	10	—	—	1.9	9.1	—	—
Supervised or practice teaching	13	35	1	10	4.2	31.8	.7	20.8
Principles of teaching (pedagogy)	12	9	4	5	3.9	8.2	2.8	10.4
Other subjects	8	10	3	46	2.6	9.1	2.1	95.8

This table shows that psychology or educational psychology has been studied by far more teachers than any other subject in the list, and next to this in order come principles of education, methods of teaching and some of the courses in special methods of teaching.

With reference to the values given to professional educational studies, tables are given (tables 7 and 8) showing quantitative valuations indicated by teachers who have pursued such courses:

TABLE 7—VALUES GIVEN TO SUBJECTS IN PROFESSIONAL EDUCATION

	Values given and frequency of occurrence					
	Total replies	No value	Little value	Medium value	High value	Descriptive answers
<b>AGRICULTURE</b>						
Instructors	13	5	2	2	1	3
Assistant professors	30	5	6	7	12	4
Associate professors	17	2	4	3	6	4
Professors	50	6	9	16	13	8
Totals	110	18	21	28	32	19
Percentages		16.4	19.1	25.5	29.1	17.3
<b>HOME ECONOMICS</b>						
Instructors	38	5	5	6	21	13
Assistant professors	27	—	1	12	12	8
Associate professors	4	—	—	—	—	4
Professors	33	2	3	6	21	11
Totals	102	7	9	24	54	36
Percentages		6.8	8.8	23.5	53.	35.3
<b>MECHANIC ARTS</b>						
Instructors	3	—	—	—	3	2
Assistant professors	7	1	1	2	4	—
Associate professors	6	—	—	3	4	—
Professors	20	—	3	7	10	4
Totals	36	1	4	12	21	6
Percentages		2.8	11.1	33.3	58.3	16.7

TABLE 8—VALUES GIVEN TO SUBJECTS IN PROFESSIONAL EDUCATION

	Total replies	Quantitative Valuation				Qualitative valuation
		No value	Small value	Medium value	High value	
General education	6	—	—	—	—	5
Agricultural education	26	—	—	—	11	18
Home economics education	9	—	—	—	4	7
Industrial education	6	—	—	—	2	4
Total	47	—	—	—	17	34
Percentage					36.1	72.3

As the tables show, more than 16 percent of the teachers of agriculture ascribe no value whatever to courses in education but less than 7 percent of the teachers of home economics and less than 3 percent of the teachers of mechanic arts have found these courses valueless. On the other hand, a considerable number (29 percent) of the teachers of agriculture ascribe high value to these courses while 53 percent of teachers of home economics and 58 percent of teachers of mechanic arts place similar estimates on this work. It would naturally be expected that teachers in departments of vocational education would give high value to such courses and as a matter of fact all of those who gave quantitative replies ascribe high value to the work.

A somewhat more satisfactory and certainly more interesting indication of the value placed upon studies in education is given by the following quotations from the descriptive replies to this question.

*Agriculture.* "These studies taught me how to adapt my teaching to the capacities and needs of my students, how to judge students, how to know them, how to understand them. I learned some valuable rules and precepts of teaching that have been useful. The history of education, psychology, methods and theory of education have given me insight and resourcefulness. I have felt that I had a somewhat clearer conception of the end to be accomplished in my work and more than that furnished by my own experience. I had the advantage of the experience of others, some of whom had been famous as teachers. They served as models for my inspiration and use. These studies gave me a broader foundation as a young teacher than I could possibly have had without them. They saved me from making more mistakes than I did, and thus served the students indirectly. They gave me considerable help that still serves me in working out new courses or improving old ones. They taught me that there is something in method and presentation, organization and administration, as well as subject matter and scholarship."—North Dakota.

*Home Economics.* "I think the educational psychology and sociology have given me a better understanding of students. The other subjects have helped me to handle, more intelligently, educational problems."—Kansas.

"Broader acquaintance with educational field in general, better knowledge of problems of administration and relationship between education and citizenship."—Kentucky.

"Educational psychology brought to my attention the mental characteristics of the high school students with whom I have been dealing. The two 'methods' classes and the long period of practice teaching, more than anything else, have helped me with my teaching."—Kentucky.

"Practical value in teaching, better understanding of human nature, inspiration for work, broader point of view, interest in education in general."—Oregon.

*Mechanic Arts.* "(1) A better appreciation of the psychology of education, (2) a greater interest in educational matters, (3) an appreciation of the great ideals of education and a better idea of how to develop them."—West Virginia.

"A little (1) in trying to determine how best to 'get across' to the student the exact idea, and then how to make it 'stick to him'; (2) by trying to analyze the results of my work each semester, as well as analyze the average work of the class. Such studies are designed for teaching grade and high school subjects and pupils, rather than college subjects and pupils."—Pennsylvania.

*Education.* "Facilitation of organization and presentation of subject matter, helpful in creation and maintenance of interest."—Iowa.

"A realization of the necessity of studying aims in instruction and of devising methods that will accomplish those aims as fully as possible. A philosophy of education that gives one guiding principles as to the organization and administration of public education and a knowledge of ways and means of making those principles effective. The foundation of a large part of all thinking and work in problems of education."—New York.

"These subjects have been a great help to me in my teaching in enabling me to eliminate the useless material."—Virginia.

*Teaching experience.* In all but three of the institutions, instructors may be appointed without previous teaching experience. Massachusetts,

Pennsylvania and South Dakota indicated a requirement of at least one year's teaching experience. In the case of Massachusetts, "teaching or experimental work" is required before appointment to the position of instructor. Seven of the institutions (22.6 percent) indicated that they have no fixed standards as to previous teaching experience; 6 (19.3 percent) say that experience is required but there is no fixed minimum; 14 (45.2 percent) say that it is desirable, but not insisted upon; and 2 (6.4 percent) say that it is desirable, but not attainable. Records from individual instructors show that 29.3 percent of them have had teaching experience in other colleges as follows: Nineteen of them (13.3 percent) for 1 year; 8 (5.6 percent) for 2 years; 6 (4.2 percent) for 3 years; and 9 (6.3 percent) for more than 3 years.

For the position of assistant professor, more definite teaching requirements are indicated. One year is the minimum in 6 institutions (19.3 percent), 2 years in 7 institutions (22.6 percent), 4 years in 2 institutions (6.4 percent), and 1 year in 1 of the colleges. Here, again, 7 institutions indicated no fixed standards and 6 say that experience is required but that there is no fixed minimum. Forty-five percent of the assistant professors reporting on their experience have held teaching positions in other colleges as follows: Twenty-two (13 percent) for one year; 10 (5.9 percent) for 2 years; 13 (7.7 percent) for 3 years; and 32 (18.9 percent) for more than 3 years.

The position of associate professor calls for still further experience, except in Pennsylvania, where 1 year of teaching experience may be accepted for this position and for the full professorship. A minimum of 2 years' experience is required in 5 colleges (16 percent), 3 years' in 2 (6.4 percent), 4 years' in 4 (12.9 percent), and 5 years' in 2 (6.4 percent). Again, there are 7 with no fixed standards and 5 with requirements but with no fixed minimum. More than 63 percent of the associate professors reporting have had teaching experience in other colleges as follows: Ten (10.2 percent) for 1 year; 8 (8.2 percent) for 2 years; 7 (7.1 percent) for 3 years; and 34 (34.8 percent) for more than 3 years.

For the full professorship, 9 institutions make the same experience requirements as for the assistant professorship, but as a whole, the institutions indicated higher standards for the full professorship. Four institutions will accept 2 years' (2 of them, 2 or several years') experience in teaching; 4 require 4 years of such experience, and 7 require 5 or more years, 1 indicating 6 years as the minimum and 1 (New York) 5 years beyond the five-year requirement for the assistant professorship. The experience of professors in other institutions has been about the same as that of associate professors. Sixty percent of them have served in other colleges as follows: Twenty (6.6 percent) for 1 year; 25 (8.3 percent) for 2 years; 28 (9.3 percent) for three years; and 128 (42.5 percent) for more than 3 years. Analyzing the figures further we find that 31 percent of the full professors have had more than 5 years' experience in other institutions. These teaching experience figures apply only to teachers of agriculture, home economics and mechanic arts, and not to teachers of education.

Data for teaching experience are given in tables 9 and 10:

TABLE 9—EXPERIENCE OF TEACHERS IN OTHER INSTITUTIONS THAN THE ONE NOW CONNECTED WITH—PERCENTAGES

TEACHERS OF	Number of institutions				Number of years					
	1	2	3	4	1	2	3	4	5	More than 5
Agriculture	29.3	17.2	0.5	0.3	10.4	7.8	7.3	6.3	6.1	14.9
Home economics	37.5	19.2	8.6	4.8	13.4	6.7	13.4	8.6	4.8	19.2
Mechanic arts	21.2	15.4	3.3	4.8	7.7	6.3	5.3	1.4	2.4	25.5
Education	28.3	20.8	7.5	3.7	13.2	9.4	3.7	15.1	5.6	15.0

TABLE 10—COLLEGE TEACHING EXPERIENCE IN THE INSTITUTION NOW CONNECTED WITH—PERCENTAGES

	Years of experience					
	1	2	3	4	5	More than 5
Agriculture	26.1	11.3	9.1	5.5	6.3	41.8
Home economics	29.1	25.6	12.8	8.5	6.9	17.1
Mechanic arts	21.0	11.0	8.2	4.6	5.0	50.2
Education	47.2	18.9	9.4	7.6	0.0	16.9

	Number of subjects now teaching				
	1	2	3	4	5
Agriculture	70.4	18.3	8.1	2.5	0.7
Home economics	32.1	25.0	17.9	10.7	4.5
Mechanic arts	56.1	23.5	8.1	5.0	3.2
Education	38.6	15.9	20.5	11.4	9.0

Analyzing the figures in these tables by subject-matter groups we find no striking contrasts, except in two cases: (1) That of mechanic arts teachers, who seem to have held longer tenures than any of the other groups—25.5 percent having more than 5 years' experience in other colleges, and 50.2 percent having more than 5 years' in the colleges from which they report; and (2) that of the education group who have been shifting positions much of late, with the result that 66 percent of them have been 2 years or less in their present positions.

*Number of subjects carried by teachers.* The question to individual teachers concerning their experience called for an enumeration of subjects taught. From 764 replies to this question an attempt has been made to show in a comparative way the number of subjects teachers are now carrying. This compilation has been attended with considerable difficulty for two reasons: (1) In some cases it has been difficult to distinguish between the subjects they have been teaching and those they are now teaching, and (2) in other cases it has been difficult to distinguish between "courses taught" and "subjects taught". One or two examples will illustrate the basis of interpretation. If a reply mentioned courses in two of the main divisions of agriculture—animal husbandry, agronomy, rural engineering or rural economics, or of similar grand divisions in home economics or in engineering—the teacher was given credit for two subjects, but if he mentioned two or more courses in any one of these subjects, he was usually given credit for only subject. In case of doubt the rule was to give the teacher credit for more rather than less subjects.

The results are rather surprising. Almost 60 percent (59.8 percent) of all teachers confine their work to one subject like nutrition, or poultry husbandry, or machine design; and less than 12 percent (11.4 percent) are teaching more than two subjects. The teachers of vocational subjects

may be overworked, as many of them doubtless are, but the individual teachers are not holding down professional "settees" as in ye olden days.

In this connection the comparative figures in Table 10 are of interest in showing the higher percentage of teachers in the home economics and the education groups who are carrying 3 or 4 subjects and the higher percentage in agriculture and in mechanic arts who carry only one subject. The older subject-matter groups seem to be better manned.

*Vocational experience.* Vocational experience in relation to subject matter to be taught is definitely required by 15 of the land-grant colleges that replied to the committee's questionnaire, but only 5 of these have fixed minimum requirements—Pennsylvania with 1 year, and Delaware, Maine, Oklahoma and South Dakota with 2 years. Ten of these (32.3 percent) state that vocational experience is insisted upon, but that they have no fixed minimum. Eight others (25.8 percent) indicate vocational experience as desirable but not insisted upon. In no case is the requirement for the higher positions greater than that for instructors in the land-grant colleges, but in the South Dakota institution with no experience requirement for engineering instructors, a minimum of 1 year of shop experience is required for assistant professorship and 2 years for the associate professorships and full professorships. Tennessee has no minimum requirement in agriculture and a minimum requirement of 1 year in home economics and in engineering for all grades of teachers.

*Summary.* In general, it may be said that the qualifications sought for teachers of the several grades in the land-grant colleges are of about the same standards in agriculture, home economics and engineering and differ only with respect to subject matter. Practically all of the institutions have certain minimum requirements that serve as guides in the selection of teachers, but it is safe to say that all of them make many exceptions. In some cases, exceptional experience may off-set lack of scholastic or technical training. In others, exceptional administrative ability may give a man or woman, who has no degree, high rank in an institution. As one president wrote, "We consider that the native ability, initiative, energy, capacity for harmonious cooperation with both students and colleagues, and personality are fully as important factors in the success of an instructor as are degrees and general and special training and experience."

The next paper was by Dean R. L. Watts, Pennsylvania State College, as follows:

#### WHAT CAN BE DONE TO IMPROVE THE TEACHING METHODS OF THE PRESENT STAFF?

BY R. L. WATTS

There is great similarity in the teaching staffs of the various agricultural colleges. Probably no institution believes in "inbreeding". It is unlikely, therefore, that the majority of teachers in any college are selected from its own graduates. On the other hand, most colleges follow the policy of appointing teachers from other institutions which afford the kind and quality of training required. This universal practice naturally results in the selection of staffs representing many colleges.



Now what are the chief considerations we have in mind when seeking the services of new instructors? Do we not generally raise such questions as, "Has the applicant had the required technical training?" "Is he well grounded in the fundamental sciences?" "Has he a thorough knowledge of soils, farm crops, pomology, or other subject he is to teach?" Then there may be a long list of questions regarding character, personality, habits, etc., of the prospective instructor. If he has had teaching experience, of course we want to know whether he was successful. If, however, he has just completed an undergraduate course, does the idea even occur to most of us that we might very properly ask a few questions regarding his training in pedagogy or in the principles and practices of teaching? A survey of the teachers in the colleges of agriculture would, no doubt, reveal the fact that most of them have not had training in professional educational subjects. In other words, their knowledge of what to teach is far greater than their knowledge of how to teach.

Various means are employed to a greater or lesser extent for the improvement of college teachers in service. A small percentage of the teaching force pursues resident professional courses in educational subjects, given in other departments, which method deserves encouragement. A much smaller percentage of the instructors is so ambitious to become "top-notchers" in the profession that they are granted leave of absence in order that they may take special work in pedagogy at some institution that ranks high in the quality of work in educational psychology and kindred subjects. Unquestionably this means of improvement should have our heartiest support. Again, much has been accomplished by the careful supervision of the courses offered.

However, these means have been inadequate and the vital question to raise, in view of the fact that most college teachers of agriculture have not had training in professional education subjects, is "What can be done (in residence) to improve the teaching methods of the present staff?"

This problem presented itself to the faculty of the School of Agriculture of the Pennsylvania State College and by the unanimous vote of its members an experiment in teacher-training was decided upon. It is this experiment that I have been requested to discuss today.

In the first place it should be made clear that this was a project of the faculty, the members of which were anxious to improve the quality of their work. Their favorable attitude was not only shown by the unanimous vote to undertake the work, but more positively by the enrollment in the class of 95 percent of the teaching staff, in addition to a number of specialists who were engaged wholly in research. Accordingly, Doctor William H. Kilpatrick, of Teachers' College, Columbia University, was invited to come to State College to teach the teachers of the School of Agriculture. Hours were selected when all could attend. The work began January 26, 1920, and continued one week. Ten lessons were given during this time.

This was a real class in every sense of the word. Its members were present on time, showed intense interest, took notes, endured the embarrassment of some questions from the teacher which they could not answer, quizzed their instructor, remained to ask questions after class, and read assigned readings. They sat "at the feet" of a master teacher. This in itself was of inestimable value to men who are eager to do the very best

work in the classroom. Interest grew from day to day and when the course closed every member of the class considered the venture a signal success.

The following condensed outline of the course is indicative as to the work covered:

#### I. THE PROBLEM OF METHOD

- (1) How do you explain the fact that the equally learned are not always equally good at teaching?  
What do you think are the more important factors involved?
- (2) As concerns college teaching, what is the problem of method?  
Is method concerned with *how* or with *what*?  
What are the ends to be sought and the dangers to be avoided by good methods?
- (3) Is method a question of what the student should do or of what the instructor should do?  
Either or neither or both? Which?
- (4) Can there be teaching without a correlative learning?  
Learning without a correlative teaching?  
What does it mean to learn? To teach?
- (5) Did you have to learn all you can do?
- (6) What are the likenesses and the differences among the following: habit, instinct, reflex, capacity, idea, knowledge, attitude?
- (7) In agricultural education what differentiated types of learning (or teaching) is it wise to distinguish (e. g., lecture-room, science laboratory, cattle judging)?

#### REFERENCES:

Cyclopedia of Education: Learning: Method.

Dewey, Democracy and Education (See Index).

*Note:* Do not expect too much from reading references, nor be too much troubled about them. Thinking will do more good than reading.

#### II. THE LAWS OF LEARNING

- (1) What is meant by S\_\_\_\_\_R? Illustrate.
- (2) Can all human behavior be so described?
- (3) In terms of S\_\_\_\_\_R define instinct, reflex, capacity, learning, law of learning.
- (4) State and illustrate the three principal laws of learning.
- (5) State the subsidiary laws of multiple response and "set".
- (6) From some instance of (reality) whole-hearted activity known to you, give illustrations of S, R, \_\_\_\_\_, "set", the three laws of learning.
- (7) In terms of S\_\_\_\_\_R analysis how would you define the problem of Method? What suggestions does this analysis make toward a solution of the problem?

#### REFERENCES:

Thorndyke, Educational Psychology, Vol. II, pp. 1-16.

Thorndyke, Educational Psychology, Brief Courses, pp. 125-137.

Kilpatrick, The Project Method, pp. 7-9.

*Note:* It will be necessary to read one of these references.

## III. THE UTILIZATION OF PURPOSES

- (1) What is the relation of purpose to the "set"?
- (2) Show how a whole-hearted purpose acts to utilize the laws of learning.
- (3) By contrast show how the laws of learning operate in a case of extremely distasteful activity motivated only by a fear of a more disagreeable alternative.
- (4) Using an incident known to you distinguish the meanings of the terms: primary, associate, and concomitant. Do these distinctions apply as definitely to college students as to elementary school pupils?
- (5) Show how a purpose operates to organize the several successive steps in a completed purposeful act.

## REFERENCES:

Kilpatrick, *The Project Method*, pp. 8-11.

## IV. ORGANIZATION

- (1) Give some typical cases where one element in a situation "points to" or "means" something else. What does meaning mean?
- (2) What have meanings to do with thinking?
- (3) What connection is there between meanings and ideas (or concepts)?
- (4) What is an idea (concept) for? How does it come into being? Could you illustrate by any idea (concept of anything) you have lately got?
- (5) If you could conclude from experience that a certain dog was a safe playmate for a child, wherein would the order and manner of discovering the fact differ from the order and manner of stating the fact?
- (6) When does a child begin to experience government (in any form)? When to organize the results of his experience? When does he finish discovering governmental relationships, after or before he begins to organize and formulate? Definition: The order and process of experience and discovery we call the "psychological"; the corresponding mental arrangement of results we call the "logical".
- (7) How does the "logical" come into existence? For what purpose? Is it made with conscious intent? Always? Ever? Can another (e. g., teacher or a book) help in the process? What, if any, connection between logic and "logicals"?
- (8) As a child grows older, what happens to his "psychologicals"?
- (9) What is meant by "psychologizing" subject matter?
- (10) In the foregoing what is the difference between common-sense and science? Between the purpose of the teacher and the purpose of the scientist?

## REFERENCES:

Dewey, *Child and Curriculum*, pp. 25 ff. (Also in *School and Child*, pp. 33 ff.)  
 Dewey, *How We Think*, pp. 56-63.

## V. ATTAINING EDUCATIONAL OBJECTIVES

- (1) Taking the following as a scheme or (formal) educational objectives, what are some of the typical instances that agricultural education would place under the respective headings?
  - (a) Habits. (d) Ideals.
  - (b) Skills. (e) Attitudes.
  - (c) Knowledges.
    - Concepts (ideas).
    - Facts.
    - Principles.
- (2) Using the S\_\_\_\_R terminology, explain how you would with respect to an instance under each of the foregoing so arrange procedure as (1) to select the right bonds to be fixed and (2) to utilize the laws of learning (set, effect, and exercise) to the fixing of these bonds.
- (3) In Q. 2 how necessary is student activity? How feasible? How would student purpose help? How feasible is it?

## VI. APPLICATIONS

- (1) In the light of all the foregoing how would you have each of the following so go on or so be conducted as to
  - (a) Utilize as far as possible the principles of method.
    - Stimulate to vigorous activity.
    - Select proper bonds for fixing.
    - Use the laws of learning (set, effort, and exercise).
  - (b) Otherwise secure desirable results.
  - (c) Avoid the dangers liable to be met.
    - Meeting the class the first day.
    - Seating students.
    - Calling the roll.
    - Making assignments.
    - Using text-books.
    - Lecturing.
    - Holding class discussions.
    - Questioning.
    - Waking up the inattentive.
    - Using charts and blackboards.
    - Using laboratory manuals.
    - Conducting projects or extra-laboratory experiments.
    - Judging cattle or the like.
    - Securing work for students.
    - Assigning references for reading.
    - Holding examinations.

Just before I started for this meeting, a hasty survey was made among our teachers to determine their attitude toward the proposition after five months of experience in the classroom following Dr. Kilpatrick's course. Some of their comments may be of interest to you. Among them may be mentioned the following:

"Dr. Kilpatrick impressed me as being an exceptional teacher, one who 'practices what he preaches'. It was a memorable opportunity to be able to attend his classes. His explanation of the process of learning and

the essential factors involved could not but be of great help to all teachers, young or old, but especially to the young teacher who has not formulated a more or less definite system of teaching. The informal lectures used by Dr. Kilpatrick furnished a delightful and invigorating method of teaching."

"His lectures have had a marked influence on my daily teaching. The short courses in soil fertility were worked out according to his questioning scheme and I was very much pleased with the results and shall endeavor to incorporate more of his ideas each year. With my four-year men, I have not followed his questioning method fully, still I have endeavored to interrupt my lectures by asking questions as often as possible. Have tried to avoid the 'parrot' lecture method."

"I believe that in the past nearly all of us have paid too little attention to the method of presentation. I think that we have allowed the importance of the subject matter to overshadow the methods used of presenting it. Many of us have become so accustomed to the old methods that it will take a lot of teaching for us to change to the new."

"Went first out of curiosity; then could not stay away."

"Was most impressed with his arguments in favor of inductive teaching as opposed to the common method of giving lectures only, with little opportunity for discussion or for stimulating the initiative of the student."

"In the past teachers have seemingly gone on with the idea that the information which they have is all-sufficient and that the student must adapt himself to the idea of the teacher. Dr. Kilpatrick's lectures would seem to indicate that the teacher must study very carefully his students and adapt his work to their needs."

"Have prepared for my course sets of questions with references; these to be studied and discussed at a later meeting. This plan has been found to work well."

"A number of our teachers formed the habit of meeting in small groups to discuss Dr. Kilpatrick's lessons. This was at Dr. Kilpatrick's suggestion and they found it so helpful that a number of our teachers have been continuing conferences on the subject of 'Improving methods of teaching our subjects'." (From a department head.)

"Through his aid we feel that we are making greater progress in developing our students to do their own thinking."

"Suggested ways of carrying out a teaching program that were of very material benefit."

"I can most heartily recommend a repetition of these courses or a new course of lectures that would further improve the teaching in the college."

"The week's contact with Dr. Kilpatrick fixed the desire among those who attended to encourage the students to take a more active part, and encouraged them to contrive ways and means for getting the students to seek out fundamental truths for themselves instead of taking ready-made ideas and conclusions from the instructors."

"Dr. Kilpatrick is such a good teacher himself that we learned quite as much from observation as we did from his theory."

*Note:* Nov. 3, 1920. The faculty of the School of Agriculture of the Pennsylvania State College has just voted, unanimously, to have another short course this winter on methods of teaching.

Dean T. P. Cooper, Kentucky State University, presented the following paper:

#### QUANTITY AND QUALITY OF TEACHING IN THE AGRICULTURAL COLLEGE

By T. P. COOPER

The determination of the quantity and quality of teaching done by members of the staff is one of the important as well as difficult problems of an administrative officer. Theoretically, teaching in a college is performed by trained men and women who have the greatest possible latitude

not only in method of presentation but in subject matter. Frequently, the teaching is performed by persons without previous teaching experience and without particular training in the essentials or methods of teaching. A college thus becomes its own teaching laboratory. The development of ideals, of methods, and finally of results, rests with the heads of departments and administrative officers. The foundations of such teaching are dissimilar from those of our secondary schools and hence the standards of measurement that have been applied in the secondary schools are inapplicable to our institutions of higher instruction.

In the final analysis, the quality of teaching in a college is reflected by the ability and progress of the men and women who have been under instruction. If the student in after life develops the ability to apply and to think clearly and has coupled with it high character and initiative, we may rightly attribute a portion of this, at least so far as his profession utilizes the results of collegiate instruction, to the work of the teacher. Unless these qualities are developed in a student, we may properly, conclude that in some aspects teaching has failed.

These criteria are relatively intangible and are so remote at times that it is difficult to properly and effectively value the quality of the teacher's work. The question of quantity of work is of course easily ascertainable. Classroom hours or the hours spent in the laboratory, the number of students in the class, all become adequate measurements of quantity and may at least be placed upon a comparative basis in the same institution.

Numerous suggestions have been made from time to time as to methods of determining the efficiency of a teacher, the value of a teacher or the quality of his work. These systems are necessarily based upon arbitrary standards and when proportioned in terms of percentages, two administrative officers will seldom agree as to their relative valuation. Neither does the one to whom they are applied consider them fair. It is virtually impossible to develop an arbitrary system of points with accompanying percentages of an ideal of perfection that determines quality of teaching to the satisfaction of any one but the author. We must consider the question of quality of teaching largely from the standpoint of the various intangible features involved. Each administrative officer may apply factors differently and mentally determine relative quality. There are, however, certain factors which enter into quality of teaching which I believe lead to comparative unanimity of opinion as to a teacher's effectiveness. The factors do not have clearly defined boundaries and the twilight zones are numerous.

#### FACTORS ENTERING INTO THE QUALITY OF TEACHING

(1) *The organization and outline of material to be presented*, which includes the richness or quality of the material and its application to the class of students for which it is prepared. Unless the material to be presented is definitely organized as to content and accompanied with the proper proportion of lecture, recitation and laboratory work, it is almost impossible to do teaching of a good grade. One of the problems of the Agricultural College is to insure that the material presented will not be too dilute.

(2) *Presentation of the subject matter*, which includes the art of

teaching, simplicity, clearness, methods of stimulation of the student's mind and the enthusiasm of the teacher.

(3) *Personality*, which includes the quality of personal magnetism, the ability to inspire the student, to arouse interest and to secure the respect of the community.

(4) *Character*. It is not sufficient that one should have high ethical ideals, but these ideals must be accompanied by good character.

(5) *Scholarship and ability to grow in the profession*. Growth of the teacher is essential. Routine teaching and teaching of poor quality are probably most frequent in the teacher who has ceased to grow in his profession.

In presenting the above statement of the factors that enter into quality, or that enable one to determine the quality, of teaching, I realize that I have not definitely answered the question as to how one may determine quality. It is my thought, however, that the factors named when applied to the teacher and his work give us a very fair idea as to the quality, even though these factors may not represent accurate measurements and possibly do not lend themselves to arbitrary percentages. The determination of quality of teaching is then only reached by the balancing of the factors named or such others as may seem applicable or desirable. The information upon which to base an opinion can only be obtained by frequent conference to determine the character of the material to be presented, visitation of the class and care in the selection of teachers with the necessary personal attributes. Although the criterion of greatest importance is student reaction, as indicated by his ability, acts, and expression, yet to paraphrase the old adage, great teachers and teaching of quality are known by their students. Finally, the administrative officer now-a-days is confronted not only with the question of how to secure teaching of quality, but how to secure any kind of teaching at all.

The following paper was presented by Professor D. J. Crosby, Cornell University:

#### THE NEED OF SPECIAL TRAINING FOR EXTENSION WORKERS

By D. J. CROSBY

In the first place I want to make two general statements as a guide for the discussion of this subject.

(1) In whatever field he works, the extension worker is essentially a teacher. Starting with certain essential qualifications like personality, common sense, vocational experience, what other intellectual tools does the extension worker require that can be supplied by the college?

(2) The extension worker, whether a county agent, a State or district leader, or a specialist, needs (a) more than anything else a good broad educational foundation; (b) technical training in the vocation of the people with whom he is to deal—in agriculture or in home making, with added emphasis on the vocational phase of his choosing, e. g., animal husbandry of nutrition; (c) professional training in education, with emphasis in his particular field.

*What is now being done to train extension workers.* About two weeks ago letters were sent to all extension directors asking them what the

colleges are now doing, their opinions as to the need of special training for extension workers, their opinions of the recommendations of the committee on instruction in agriculture in its reports of 1915 to this association on College Courses for the Training of Extension Workers. The time was too short to obtain replies from all the colleges. Eighteen replies were received and of these sixteen were in favor of special training for extension workers, one thought the time was not yet ripe and one was doubtful of the value of such work. There were no criticisms of the committees' recommendations except that they did not go far enough.

Only six of the eighteen colleges are offering courses for extension workers. These may be briefly described as follows:

Illinois. In the summer of 1919 offered a course for extension workers in home economics with 8 or 10 students taking it. Offered again in 1920 with no takers.

Minnesota. A course on organization, methods, and policies in extension work—2 to 3 hours credit, for juniors and seniors, 98 students.

Field practice on part salary and college credit 3 to 12 hours for juniors and seniors—2 students. Given by State leader.

Missouri. Extension in field crops 1 credit.

New York. Extension 1, 2 hours, juniors and seniors, 85 students.

Extension 2, 2 hours, juniors and seniors, 70 students.

These courses consist of parliamentary practice, public speaking graphic methods, and extension problems.

Extension 3, 2 hours, seniors, extension organization, and policies. Given by the vice-directors, 6 students.

Extension 5, 2 hours, agricultural journalism, 56 students.

Extension 6, 1 hour, agricultural news writing, 9 students.

Laboratory course.

Ohio. Extension methods, 2 hours, seniors, 30 students. Given by the director.

Wisconsin. Boys' and girls' club work, 2 hours, 14 students.

Training course for county agents, 2 hours, organization and policies, 23 students. Given by the assistant director.

Seminar in agricultural education, credit to be arranged, problems in agricultural extension and teaching, 13 students. Given by the assistant director.

Agricultural extension methods and problems, 2 credits. Given by the assistant director.

Special problems of elementary vocational or collegiate agricultural education, extension, county agent, or demonstration work. A graduate course, credits to be arranged. Given by the assistant director.

Vocational agriculture, 2 credits, methods of instruction, a graduate course. Given by the associate professor of agricultural education.

Five years ago Iowa, Nebraska, and Texas were giving some courses, for extension workers, but these States did not send in replies at this time.

*Recommendations of the Committee on Instruction in Agriculture in 1915.* "Summarizing, the committee believes that a considerable number of the agricultural colleges should formulate and offer courses for the preparation of extension workers, that both undergraduate and graduate courses should be provided for, that familiarity with the ordinary farm operations on a good farm should be a prerequisite to entering the under-



graduate course, that enough of the undergraduate work should be prescribed to insure mastery of the agricultural applications of physics, chemistry, botany, and zoology, and of the fundamentals of agriculture, that moderate specialization should be provided for through group electives, and that by means of required and elective courses adequate provision should be made for work in rural social, and economic science, in professional courses for the teachers and the extension workers, and in public speaking and other forms of self-expression."

"We believe that graduate extension work should be developed in at least a few of the agricultural colleges, that both resident graduate work and practice should be provided for, that one year of resident graduate work should lead to the master of science degree, that postgraduate practice should round out the previous experience of the student in both farm operations and extension work, and that this practice should be supervised by the college or its accredited representatives."

*Opinions of county agents.* A committee of State leaders of county agents of which Karl Knaus of Kansas is chairman, has recently sent a questionnaire to county agents, "relative to the advantage of special courses to fit men for county agent work". Mr. Knaus has kindly loaned me a copy of the tabulated replies from 487 county agents, representing 12 States in the North and West. These replies have a very significant bearing on our discussion here.

The fourth question asks whether a county agent should be a specialist in some one subject with a strong major training, or is a general training more desirable. Eighteen percent of the replies were in favor of special training and 79 percent in favor of general training.

In question 5, the county agents were asked to check in a list of subjects given those which they believed should be given a term or more of study either in undergraduate or postgraduate work. The percentages voting for each subject are as follows: Journalism, 85 percent; psychology, 69 percent; administration, 86 percent; extension organization, 69 percent; photography, 39 percent; public speaking, 89 percent; marketing, 90 percent. They were also asked to suggest additional subjects and 9 percent suggested economics; 5 percent, farm management; 3 percent, commercial and business law; 1.4 percent, sociology; and 1.2 percent, salesmanship.

Question 6 asked whether they believed a summer's work, say 3 months, as assistant to a good county agent with a thesis on the work, should be a part of the course. Ninety-three percent were in favor of such work and 6 percent voted "no".

The seventh question was as follows: "Do you consider that young men starting in as county agricultural agents would find it best to have their undergraduate course modified or should they stay and take the special training and postgraduate work?" Fifty-five percent of the replies were in favor of staying for special training and postgraduate work, while 38 percent voted for a modification of the undergraduate course.

In reply to the question "should the land-grant colleges undertake to establish such courses," 82 percent replied in the affirmative and 6 percent in the negative.

This evidence from the county agents and the replies from directors of extension clearly establish, it seems to me, the demand for special training for extension workers, and confirm the judgment of the committee on instruction in agriculture in its recommendations as to the general character and subject matter of undergraduate courses and as to the need

for graduate study provisions in at least a few of the agricultural colleges.

The next question is, "What shall we do about it?" Briefly, I believe that we need (1) to develop and strengthen our work in rural economics (including marketing), in rural social science, and in agricultural education, including opportunity for graduate work in these subjects, (2) to pay considerable attention to outlining required or recommended groups of studies for extension workers, (3) to develop special work in English, including public speaking and agricultural journalism, and in extension organization and methods, and (4) to develop graduate work for those wishing more thoroughly to prepare themselves for this work, and this should include supervised practice work.

Dean J. L. Hills, University of Vermont, made the following statement regarding the advisability of continuing the graduate school of agriculture:

#### SHOULD THE GRADUATE SCHOOL OF AGRICULTURE BE REVIVED?

BY J. L. HILLS

I am informed by members of the Standing Committee on Graduate Study that no meeting has been held, that none is contemplated at this convention and that the three members present expect to suggest to the Executive Body that the committee be discontinued and discharged on the ground that its work is done. This action has been foreshadowed by its reports of recent years. This leads the writer to query whether this is a wake or a pulmotor party. If the school is a corpse, why disturb the remains? If, however, it is in a state of suspended animation, should the pulmotor be used?

The graduate school was started in 1902. The biennial sessions—7 in all—continued until 1916 and were attended by 75, 91, 125, 207, 139, 150 and 153 students. However, the attendances from outside institutional walls during the last four years were only 126, 89, 83, 66, or, respectively, 60, 65, 55 and 40 percent of the entire number. During the last two years, 50 percent of the students were homegrown.

The last school cost almost \$5,000. It was well advertised, 5,000 initial prospectuses, 12,000 prospectuses, and several thousand programs being distributed. Posters were placed in every agricultural college in the land, announcements made in Experiment Station Record, Weekly News Letter, and in many agricultural journals, and a considerable amount of correspondence was carried on, and 66 students paid fees. The program was attractive, the location convenient, the facilities ample, and the faculty unsurpassed. Is the game worth the candle?

The Committee on Graduate Study, which has given careful thought to the whole proposition, reported in 1917 that "it is evident that the causes which have operated to depress the attendance at other sessions have increased in influence and were not overcome by unusually active measures to advertise the school this year. Among these hindrances, the most potent seem to be the great increase of summer work and other burdens on members of the college faculties, the opening up of greater opportunities for regular graduate work in agriculture at numerous institutions, and the inability of the association's graduate school, under present conditions, to

give credit for the work done there which might be used elsewhere as part of the requirements for advanced degrees."

It further said that "due consideration should be given to the increasing opportunities for graduate work in agriculture offered at many institutions. Data collected by the States Relations Service show that, of the 48 land-grant institutions, 25 had six or more graduate students in agriculture enrolled during the academic year 1915-16. The largest number reported was 238 and the second and third largest respectively were 99 and 65, the total for all the institutions being 938. . . . It is obvious that systematic graduate work occupies a much larger place in our scheme of agricultural education than it did 15 years ago and that the situation has materially changed since the inauguration of the graduate summer school.

"These facts, while gratifying, suggest the query whether the graduate summer school in its present form may not have accomplished to a large extent the principal object for which it was founded and raise the question what shall be the future policy of the association as regards the promotion of graduate study in agriculture."

The question now under discussion has to do with the graduate school of agriculture. When this school first opened its doors in 1902, as an association we were dealing almost solely with matters agricultural. We are now no longer unitarian but trinitarian. Indeed, like Wordsworth's little girl, we truly can declare that "we are seven"—general session, executive body, resident teaching, experiment station, extension service, engineering, and home economics; but, unlike the brothers and sisters of this little girl, none of us "in the churchyard lie" since all of us are virile. It well may be, that e. g., a graduate school of home economics might be fostered by this third-of-a-century old organization and that such a school might step into dead men's shoes. But that is not for me or for you to say.

The writer holds with the members of the Committee on Graduate Study that the graduate school of agriculture has lived a good life and done good work; that its example has inspired many a land-grant college administration to establish graduate work in agriculture; that these, its children, so to speak, will live long and flourish, a credit to their foster-parent. I am of the opinion that it were unwise, under the circumstances, to attempt to pulmotorize the school; that, rather, we should say—Well done, good and faithful agent of the land-grant colleges in their efforts to improve teaching and research in agriculture! *Requiescat in pace!*

It was voted that the Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts be instructed to include in its report for next year a record of new ideas and methods as practiced in the several institutions with a view to keeping the members of the association informed as to what is going on in the field of agricultural education.

#### ELECTION OF OFFICERS

The following officers were elected: Chairman, R. L. Watts of Pennsylvania; secretary, C. D. Jarvis of the United States Bureau of Education.

## SECTION OF AGRICULTURE—EXPERIMENT STATION WORK

WEDNESDAY MORNING, OCTOBER 20, 1920

Dean A. R. Mann, New York State College of Agriculture, chairman of the subsection, presided.

E. W. Allen, States Relations Service, United States Department of Agriculture, presented the following paper:

### EFFECTS OF THE WAR ON RESEARCH IN AGRICULTURE

By E. W. ALLEN

In considering this subject attention will be given primarily to the experiment stations, for although they are not the only agencies for agricultural research, they are typical. Along with the effects of the war those of some other conditions which accompanied it or were merely contemporaneous will necessarily be included, since it is difficult to separate them.

The war itself interrupted the growth of the experiment stations and their work. It diverted attention and interest from them to some extent, as was natural, and it brought about conditions which seriously handicapped them for the time being. If these things had been merely temporary they would not be so serious, but that was not wholly the case. The after-effects constitute the real factor in the situation as it interests us now.

Probably the first noticeable effect was on the personnel. In addition to those who joined the war service in some form, many went into the industries or other branches more lucrative than station work, and others were made unsettled. The conditions were demoralizing to a considerable number. No live worker could escape the feeling that was in the air.

The loss of men was tremendous. For the six-year period from 1914 to 1919, the turnover in the personnel of the stations was no less than 80 percent. That is to say, nearly 1,400 of those occupying technical positions, out of a total roster of approximately 1,700, left their positions for other openings, a large proportion of them outside. By actual count there was a decline of about 250 persons in the combined station staffs. While the assistant grade was most largely represented in these separations, 370 department heads and leaders of special lines made a change, equivalent to an average of 7 leading workers for every station. Of this expert class, upwards of 150 went into industrial or commercial lines, about 50 into extension work, an equal number to the National and State departments of agriculture, and nearly as many more into exclusively teaching positions.

While a small proportion, therefore, remained in agricultural investigation, the large majority were not only lost to the stations but to agricultural investigation for the present. To this extent the stations are the poorer, because the vacancies were often filled by advancement to the higher posts or appointment of persons less well qualified by training and experience. The difficulty of filling positions has led to suspending projects, and in some cases to closing them out prematurely.

Naturally the more advanced research is the type of activity first affected. This shows itself in a lower grade of inquiry, less skill and insight in devising means of advance along new lines, a performance of the simpler routine features with an omission of the constructive inquiry essential in original research. There are many evidences of this. The result is seen also in some of the new projects proposed for the research fund and in the elementary character of the outlines suggesting the limitations of training in the elements and the spirit of research.

The condition referred to is not an isolated or highly exceptional one. It is becoming so common that it raises a serious question of the ability of many stations to utilize any considerable additional funds in genuine research unless the staff is strengthened.

There are indications that the condition may not be a temporary one, and this constitutes one of the gravest aspects of the situation. Research as a career does not figure as prominently as it did, and the opportunities in other lines of agriculture calling for far less preparation seem more attractive to those who are coming on. That this is the case is indicated not only by the experience of the stations, but by that of the United States Civil Service Commission in filling technical positions under the Government. For example, an examination for positions of assistant in agronomy, which has usually brought over a hundred applicants, this year attracted only nine. The lack of special incentive to prepare for the service of the stations or the prospect of rank or salary which represents the high character of the work and qualifications, will continue to act as a serious handicap unless it can be corrected. The standards which had come to be recognized in the past cannot be lowered without distinct detriment to the character of the investigation.

Almost everywhere there is a decrease in the number of assistants now employed. As positions of this grade have become vacant they have often remained unfilled, partly because of the difficulty and partly because the funds could not be spared. In some places the only way to increase salaries and keep the work going has been through such economy. Leaders of projects have thus been required to do simple routine duties they were not accustomed to—a pathologist bugging his own potatoes, a plant breeder doing the ordinary cultural labor, a chemist making the routine determinations requiring skill but not imagination, etc. The spirit in which this has been accepted by such experts is fine, but it is false economy and the effect on the amount and progress of research is none the less serious. It necessarily affects the character of the things undertaken. It has been a frequent expression of men the past few years, in speaking of their future plans, to qualify by making the proposed work contingent upon having the needed assistance.

Nor has the station administration itself been exempt from change and distraction. Since 1914 the directorship of practically half the stations has changed, in 5 cases twice. Eight of the former directors went into industrial positions and hence were lost to the station work. Of these 28 administrative changes, it may be noted that in all but 3 cases the vacancies were filled by persons who had not had previous experience in directing a station; that is, they were new in that capacity. One-half of them were likewise new to station work, and only a small part had been previously engaged in investigation.

This is a rather surprising change in the system of administration

during the past five or six years. Obviously it does not mark an advance in the provision of experienced leadership in the research field; other reasons evidently actuated the appointing powers. In part it may be ascribed to change in form of organization—a doubling up in administrative positions and duties. Thus, in 9 cases the station directorship, formerly a separate office, was combined with some other office, such as president, dean, or director of extension, whose exacting duties even in normal times would leave considerably less opportunity for attention to the station than formerly. In abnormal times the things which naturally suffer under pressure are those which require more intimate study and consideration, and in the case of an experiment station these are the ones on which effective supervision and advancement most largely depend. Consequently, the war period brought a check to the stronger and more effective organization of these research institutions, which had seemed to be under way. It is gratifying to note that several of the colleges have recently made provision for a special officer under the dean, designated as director or vice-director, to look particularly after the conduct and welfare of the stations.

Apart from the changes noted in directions, the attention of administrative officers was largely diverted by other demands upon them. Many took on engrossing special duties, several went out from the institution altogether for a period, while others directed their attention quite largely to organizing the rapidly expanding extension work. There were so many unusual emergency calls upon the time of these men that the stations had to get along with a minimum of administration. There was a decrease not only of emphasis on investigation, but of stimulating influence and support, which was felt by the station forces.

While many of these things were unavoidable and were to be expected, it was not anticipated that the effect upon agricultural investigation would be so long continued. That line of effort was felt to be pretty firmly established in this country, and while we did not share the view that investigation might pause until the teaching of the farmers caught up with it, the far-reaching effect of a temporary setback was hardly foreseen. As a matter of fact, there was little forward looking in that period. Many things changed, institutions among others. When the time came to turn attention again to research it was seen how much ground had really been lost, and the weakened position became apparent. Not a few stations found it difficult, if not impossible, to get back upon the former basis. Conditions were against them.

One of these was the financial situation. As has been noted elsewhere<sup>1</sup>, the appropriations for the research activities of the experiment stations practically ceased increasing with the close of the fiscal year 1914, and remained unchanged during the five years following. This is the more marked since in each of the three five-year periods immediately preceding 1914 the total appropriations from the States had practically doubled, or increased at an even higher ratio. Because the station resources were growing to a large figure, it apparently was not realized that those for investigation and experiment had become stationary in the face of ascending costs. Under the circumstances the stations could not even stand still; they must retrograde or retrench. This is more apparent with some than with others, and

<sup>1</sup> Experiment Station Record, Vol. 43, pp. 1-9.

on the whole it is remarkable how well the stations have managed to overcome the effects of their straitened circumstances and keep their main lines of investigation going.

This halt in the station appropriations is not attributed to any marked change in public sentiment, and perhaps not primarily to the effects of the war itself. But new legislation diverted attention and placed new demands on the States which have doubtless had their effects. The passage of the Agricultural Extension Act in 1914 and the Vocational Education Act in 1917 called for offsets by the States which have increased from year to year. These charges have been added to by the Federal Road Act, which makes the largest demand of all. For the current and coming fiscal years, these three measures will call for combined contributions from the States equivalent to considerably over fifty million dollars a year. In some cases they may work against any large increase for research in the near future.

In this connection it may be noted that the amount appropriated for research is becoming relatively insignificant and plays a small part in the burden of taxation. A recent review by Dr. E. B. Rosa of the Bureau of Standards furnishes an interesting illustration of this, for it develops the rather startling fact that of the national budget, amounting for the current year to over five and a half billions, only one per cent, under a quite liberal interpretation, is for the combined purposes of research, education and developmental features. Of this one per cent, only a small fraction, of course, is for research. It would be interesting to know how the case stands with the States.

There are indications that the attitude of some of the colleges themselves toward the advancement of research has not become increasingly favorable with the growth in other directions, and that this may be a factor in the present situation of the stations. Emphasis has been laid by them on certain other lines, the demands upon them have grown, and their programs have continued to include more and more activities which take the college out to the people. With inadequate forces, the result is reflected in the station, especially in case of joint college and station employees.

The return of peace brought greatly increased attendance to nearly all of the agricultural colleges, in some cases unprecedented. These students naturally had to be cared for, necessitating heavier teaching schedules and not infrequently pressing into service those assigned primarily to the stations. The time available for research by the part-time workers was materially diminished, sometimes entirely absorbed. This was a severe setback to the return of the stations to normal. It has by no means been overcome.

The practice of dividing time of station workers with the college teaching or with the extension work is apparently on the increase. It is a result in part of straitened circumstances, the scarcity of experts, and expansion in other directions; but more often it is ascribable to the college than to the station. Pressure is laid upon the stations to carry a part of the salary of persons whose main business is teaching, and who may even be in another branch of the institution, on the assumption that they can render some service to the station. Frequently the advantage of the arrangement lies with the college rather than the station. Where much teaching is involved, it is a source of questionable strength to the station and a

tax on its slender resources. It is a reversion to a practice which there had been marked progress in correcting.

These things serve to illustrate that our research is not yet on a wholly safe and secure basis. It is the first thing to be affected by an unusual condition. The teaching must go on; the extension work must not be interrupted; and there are increasing plans for outside activities. This is right and proper, but manifestly it should not be at the permanent expense of research, and there is reason to believe it will not be.

With the growth of the colleges and the dominant position they have attained, it is reasonable to expect that research should share, when there has been time for adjustment, and that there should be active concern for its protection and stimulation—that the colleges will be insistent that their research departments grow. In the multiplicity and pressure of other interests there is some doubt whether the real condition of the stations and the consequent effects are always fully realized.

Appreciation of research is frequently of a somewhat academic or abstract character; its importance is accepted in a general way somewhat as a matter of course. As it is a mature effort and is less likely than some other branches to involve problems for the administrative head, it is easy to see that contact with the station and its needs might not always be as close as is desirable at this time. The attitude in a considerable number of cases, however, where the situation has been impressed, has been evidenced in a gratifying disposition to stress research and to make adequate support an active feature of the developmental program.

Already the legislatures of several States have made noteworthy additions to the appropriations for support. Where stations have gone before the people of their States the response has usually been excellent. Three States in the South which had not previously contributed to the support of the central stations have made generous initial appropriations the past year, and in another State the representatives of the various agricultural interests were called together, with the assistance of the president of the university, and not only endorsed a biennial station budget for nearly \$170,000, but formed a committee to actively press it before the coming legislature. Elsewhere plans for seeking larger State contributions are being laid and the feeling is generally optimistic. In cases where, for local reasons, the station does not have a separate budget or is not named in the estimates, and where it is not permitted to solicit public support for larger funds—and there are some such—relief will depend upon sympathetic and appreciative action by the college administration.

The attitude of the agricultural extension forces is increasingly appreciative of the importance of station work, and that agency can help to give publicity to the need for further support. Never has there been such a great body of sound public sentiment in support of the growth of our agricultural institutions as there is today. It needs only to be informed and guided. It is therefore highly important that there should be a wide realization of the actual conditions, and of not only what the effects may be but what they already have become.

There is still need for a quickening of interest in agricultural research, led by the colleges and expressed in their plans. It is important that attention be given to publicity which will bring the stations and their requirements more definitely home to the public. In a considerable pro-



portion of the States their condition is critical. The inequalities are one of the serious features of the situation at present. Some of the stations in position to do exceptional work are suffering most from shortage of funds. As a group they have reached the limit of their ability to maintain a satisfactory output and to keep step with the advance in the demands for teaching and extension. New problems are crowding for solution. They ought to be solved in a more definite and permanent way. This means an enlargement of the body of advanced research. Provision for this will require not only means but men adequately prepared for it. It will require guidance of the most capable character, and the strengthening of the station organization to prepare it to use larger funds.

It was moved and carried that Dr. Allen be invited to send copies of his paper to station directors in advance of its publication in the proceedings in order that the material might be available for legislative campaigns this winter.

E. A. Burnett, Director Nebraska Experiment Station, presented the following paper:

#### THE NEEDS OF THE EXPERIMENT STATIONS FOR INCREASED FEDERAL SUPPORT

BY E. A. BURNETT

The general financial condition of the experiment stations in the United States is more critical than at any previous time in their history. The cost of conducting investigation is at its highest point since their establishment, and the funds available have not increased with the rise in prices. In some of the more favored States the resources are slightly increased, though nowhere in proportion to increased cost.

The causes which have produced this era of high prices need not be here discussed. It is safe, however, to predict that these causes, while not permanent, will not rapidly disappear, and that if the agricultural experiment stations are to carry on the work which they have laid out and to investigate the new problems pressing for attention, they must do so upon a scale of prices somewhat comparable with those which now obtain.

The last three years in particular have been years of almost constant retrenchment rather than of progress. Many of the important projects of the stations are inactive from lack of funds. Completed projects have not generally been followed by new ones, and a general slowing down of work has been necessary. This slowing down comes at a time when the need for information and the demand for results are especially pressing.

Prior to the Cooperative Extension Act much data had accumulated in stations archives which had never been given adequate publicity. Extension workers utilized and adapted this material to practical field conditions, giving it new values. They also organized much new material not accumulated through station sources. On account of its liberal Federal support, and its rapid expansion, the extension service thus rapidly organized most of the information available to it. The war emergency program still further stimulated the use of every source of information which might be available for conserving and extending food production. It developed and exploited the information offered by the experiment stations, and drew

to a considerable extent upon unfinished investigation for supposed facts which had no adequate basis for promotion. The extension service was not alone in the promotion of unestablished theories. Frequently members of experiment station staffs, keen to perform some patriotic service, have promoted unworkable theories which need to be revised or discarded.

In the State of Nebraska hemorrhagic septicemia has been accused of causing large losses of cattle and hogs, while its relation to the poultry industry has been largely overlooked. Investigations show that the losses from this disease in poultry probably exceed those in either cattle or hogs, and that the causes of many of the losses attributed to this disease are not known. In the meantime, commercial interests have built up a large and flourishing business in the manufacture of serums and bacterins to prevent communicable diseases like that above mentioned. While a considerable number of these products are measureably effective, many seemingly worthless products are sold on the market and the whole problem needs thorough investigation.

At the present time little or no finished work which can be applied to farm practice lies buried in the experiment station archives, ready for publicity, but much unfinished work which will be of practical value awaits increased resources for completion. The need of the present time is for the enlargement of fundamental research rather than for publicity and promotion.

The experiment station, during its early years, built up most of its work around the problems of production. Its major efforts have continued and doubtless will continue along this line. In the meantime, new fields have opened which are of equal importance to the prosperity of the farmer and the development of rural communities. I refer to problems of farm organization, cost of production, and methods of marketing. Practically every manufacturing industry has built up a cost system upon which it bases its selling price. The farmer has had no efficient basis upon which to determine cost. Surveys and investigations only recently started are throwing much light upon this problem. Such surveys will modify our methods of production and prevent many of the losses now suffered by the farmer. They will confirm his present methods where good and eliminate those which are wasteful.

Farm marketing needs scientific study. The market machinery in use was built up by men primarily interested in reaping a profit from distribution. It is therefore not surprising that the system is more efficient to the middle-man than to either the agricultural producer or the ultimate consumer. These projects are within the field of the experiment station, since they vitally affect the economic status of the farmer and the development of rural communities.

We need data upon land tenantry, showing what types of leases are proving most satisfactory to landlord and tenant, and which maintain most satisfactorily the fertility of the soil, the community interest, and community improvement.

The readjustment of agriculture resulting from the World War will be largely economic. While problems related to production will not decrease, economic problems will very materially increase. The responsibility for the study of such problems lies with the experiment station and should come within the scope of any new legislation.

The numerous calls for stations workers by business concerns and by other educational and research institutions have seriously disturbed the work of the stations. The higher salary offered by business has taken many station men into other less congenial work. There has also been a great shifting about among institutions, the larger and better supported making heavy drains on the smaller ones. The most common topic of conversation among station directors seems to be that of replacing men who have resigned to accept better positions.

When men are in charge of important lines of investigation, they cannot drop out of the station organization without serious loss to the work under their charge. New men can seldom pick up an unfinished project and carry it to a successful completion. Much money is wasted by resignations of workers from the station staff without adequate time to complete important projects before being released.

All stations have found it difficult to fill the more important vacancies created by resignation. In some instances where the funds are available no person of suitable training can be found to take up the work laid down by another. In the majority of these instances the vacancies would never have occurred had the station been able to increase salaries in proportion to the increased cost of living. Where a vacancy has been filled, it has generally been done by securing a younger man with less experience and at a very materially increased salary.

The necessity for competing with commercial institutions, especially for young men, has placed these young and untrained men on a salary basis out of proportion to that received by men who have been years in service and who are frequently key-men in the organization. It will be agreed, I think, that the payment of high salaries to untrained men tends to break the morale of station workers and to discount technical training and experience. The remedy for this condition is, of course, to increase the salaries of trained men until they shall bear a proper relation to the salaries paid younger men in such work. Adequate support will make this possible.

Even at the relatively higher salaries paid for young men, few are looking to investigation as a life work. This indeed to my mind is one of the most critical phases of the problem confronting agricultural colleges and experiment stations. The lure of business is so great that men hesitate to spend three or four years of advanced study in training for a position which in the end does not promise sufficient reward for such effort.

The field for men trained in agriculture has widened. Opportunities have increased until many more men than formerly are required in technical positions. This demand will continue and competition for trained stations workers will increase rather than decrease with the years. The fifty cent dollar requires a new basis of support.

In the report of the Committee on Experiment Station Organization and Policy, presented by Dr. E. W. Allen at the last convention of the association (see Proceedings of the Thirty-third Annual Convention, p. 134), it is stated that during the year ending June 30, 1919, the Federal government contributed \$1,440,000 to the experiment stations, against \$2,600,000 contributed by the several States. It is possible that some increased appropriation has been secured since that time by increasing State

appropriations. The aggregate, however, is probably not much different today, while the cost of all investigation has increased.

We may look for increased support to either the State or the Federal government, or to both. Each State should increase its appropriation to its own institution. Congress should amend the Hatch or Adams Act to give increased support, or pass new legislation looking to the same end. An increased Federal appropriation, made available only upon an equal appropriation by the States, would seem to be the most satisfactory plan.

Both the Hatch Act and the Adams Act were passed at a time when Federal grants were not contingent upon an offset by the State. The Smith-Lever Extension Act, passed in 1914, and the Smith-Hughes Agricultural Education Act, passed at a later date, are based upon cooperation between the Federal and the State governments, on a basis of equal appropriations by each above an initial amount.

The Smith-Lever and the Smith-Hughes Acts, in which the Federal government offers to match dollars with the State government to promote agricultural extension and vocational education, place the experiment station under a handicap in securing appropriations from the State legislature, unless the same system is used for all. Members of the legislatures unfamiliar with the purposes of different agricultural activities and interested mainly in other questions are not likely to discriminate between various lines of agricultural work. If they match dollars with the Federal government in one and not in the other they are likely to give most support to activities in which one dollar will do the work of two. It is necessary, therefore, to secure new Federal legislation placing the experiment stations upon the same basis as the extension service before we can expect adequate support from the States.

At a recent informal meeting of a number of the experiment station directors, called to discuss the necessity for increased support for experiment stations, the following resolutions were submitted to the Executive Committee of the Association of Land-Grant Colleges:

(1) "The amendment of the Hatch Act to provide for each agricultural experiment station an increase of \$15,000 for the first year and a subsequent increase by annual increments of \$10,000 until the total additional appropriations shall equal \$85,000 per annum, exclusive of the original Hatch appropriation.

(2) "That the appropriation provided, exclusive of the original Hatch appropriation, be contingent upon equivalent local appropriations being made in the several States.

(3) "That the legislation be so drawn as to permit either the whole or any part of the additional appropriations to be available whenever equivalent offset appropriations are made by the States.

(4) "That the administration of the funds provided shall follow substantially the method of administration now provided under the Hatch Act.

(5) "Unless it should appear that under the terms of the Hatch Act, as at present drawn, the use of funds for investigation and research into the economic and social aspects of Agriculture and Home Economics is permitted, the amendment should be so drawn as to include them."

In discussing whether or not this proposed appropriation should be equal to each State or be based upon rural population, it was held that the results of investigation are general in their benefits—not bounded by State lines, but valuable to all regions where the same problems exist. For this reason, Federal appropriations for investigation should be uniform in the

several States, and should not be based upon population. It was the feeling of this committee that the resources for agricultural investigation should equal that devoted to extension work. It was generally agreed that the securing of scientific data, based upon investigation, is not less important than the dispensing of facts to the public. The public will be served best by giving as large an appropriation for investigative work as is now given to extension work.

The lines of investigation should be so broadened as to cover the large economic problems of the farmer and of rural community development. While the committee in question did not undertake to suggest any limitations for the administration of the Hatch Act, they wish to be clearly understood as favoring this broader interpretation of the stations' activities, and believe that new legislation should be specific upon this point.

It will be highly advantageous to the station work if the proposed appropriation can be secured without undue restrictions in the law, making its administration difficult and laborious. The terms of administration in the present Hatch Act are most satisfactory and except to make clear the broader field of rural economics and home economics, which it is desired to include, may well be left without further restrictions.

The work of the experiment station during the last 34 years has amply justified all of the expenditures which have been made under its organization. This work is held in the highest esteem by the public, and the benefits of such investigations are far-reaching. It would seem, therefore, easily possible to secure the needed support from Congress and the State legislatures when the matter is properly presented to them. This association should take definite action at this time looking to the introduction of a suitable bill before Congress making increased appropriations to the experiment stations. The amendment of the Hatch Act seems to be the most appropriate form of legislation.

The subject was further discussed from the standpoint of "What should be the character of further Federal legislation providing funds for agricultural research" by T. P. Cooper, Director Kentucky Experiment Station, and R. W. Thatcher, Director Minnesota Experiment Station.

**T. P. COOPER.** A discussion of the character of further Federal legislation in providing funds for agricultural research naturally develops an inquiry as to the needs of agricultural research. This discussion will deal with an angle of research for which the experiment stations should stand sponsor and which may be described as the economic and social field as applied to agriculture. It will attempt to indicate at least partially the field that requires funds if development is to take place.

Our experiment stations to a very considerable extent have devoted their resources and means largely to research in the physical and biological fields as they have applied to agriculture. Farmers have interpreted this field of work as largely concerned with problems of production and of conservation. In this broad field, the experiment stations are performing a work of almost inestimable value—a work that must be continued and more fully developed.

As has been frequently pointed out the funds available to the majority of experiment stations are scarcely sufficient to maintain work in progress with no provision for the necessary expansion. Yet there is an insistent

demand for research in the economic field of agriculture that for its successful presentation will require comparatively large sums of money. The entry of experiment stations into these new fields of investigation should not lessen or impede the progress of research in the field of production. Rather the addition of various economic and social research is required to aid in the interpretation of present studies.

The farmers of the country undoubtedly believe that the experiment stations have further work to perform and in new fields. They are not satisfied with a research service that deals largely with production. Questions are arising as to the cost of production, market influences, standards, tenancy and ownership of land, finance, the organization of agriculture and numerous problems of like nature that deal with rural economic and social studies.

The development of a fundamentally sound economic doctrine in agriculture is as necessary as research for the control of animal or plant disease or experiments to determine rational methods of maintaining the fertility of the soil or the essentials of nutrition of farm animals. Agricultural colleges and the experiment stations should through careful research determine the fundamentals at the basis of economic development in agriculture and be prepared to teach these sound practices. Possibly much of the expressed discontent in agricultural regions, the failure of agriculture as an industry to be properly recognized and numerous other economic ills that are now appearing may be due to the inculcation of false economic standards. Some one or some group will sooner or later formulate the economic thought of rural people. Safety for the future lies in the accurate and impartial development of economic fact and in its application to agriculture by the strongest and most independent of research institutions. The experiment stations are the logical institutions to carry on these investigations and they must stand sponsor for the entire rural program. No other organization in the several States is prepared either through the confidence of the people or experience in research to meet the need or the opportunity and to render impartial verdict.

A recent inquiry addressed to directors or others in 12 of the experiment stations, requesting their views as to the advisability and necessity of stations developing the field of economic and social research, brought a unanimous opinion that this must be done. Almost invariably replies pointed out the fact that a reasonable development of the field was impossible without additional funds.

The future field of investigation which in my opinion must be broadly developed may be roughly defined as the economic and social sciences affecting or affected by agriculture. The readily apparent problems that may be grouped for study are as follows:

- (a) Methods of distribution and marketing.
- (b) Organization of the farm vs. farm management.
- (c) Conditions under which production is carried on and factors affecting same.
- (d) Relationship to other industries.
- (e) Land ownership and land tenure.
- (f) Rural finance.
- (g) The organization of agriculture as an industry.
- (h) The home.

- (i) Country life development.
- (j) Transportation.
- (k) National and State legislation affecting agriculture.

The ideas thus expressed may perhaps be boiled down to rural economics and rural life problems. The problems of research in this field should probably be approached, depending upon their occurrence, conditions, etc., from three angles: (1) Certain problems may be attacked most efficiently by our Federal departments, supplemented by independent work in the State. (2) A second group of problems lend themselves particularly to research within the State and prosecution by the State possibly with the aid of the Federal department. (3) A third group of problems may be most efficiently met by the close cooperation of the Federal department and the States.

Through the Office of Farm Management of the United States Department of Agriculture the experiment stations have splendid cooperation. It would be desirable as new fields of economic or social research in agriculture are opened to make possible cooperation with other offices or bureaus as they expand their functions. The researches could well be harmonized through the Department of Agriculture and national policies evolved therefrom.

For some years, studies in farm management have been accepted as a legitimate field of research by the experiment stations and of extension through the extension division. Further Federal legislation, however, would be incomplete and unsatisfactory if it but provided funds for research in this field that has already proven its necessity to experiment stations. The potential research problems are much broader than farm management and occupy the entire sphere of rural economics.

This suggests that any scheme of financing must be broader than the field now occupied either by farm management or rural life studies. If further funds cannot be secured, some such interpretation should be given to the Hatch or Adams Acts as will permit their use in economic investigations. We should prepare to engage aggressively in research in as much of the field of agriculture, used in its broader sense, as the training of our men will permit.

If research in the field outlined is to be developed, further Federal appropriations to the State supplemented by State appropriations are essential. By no other means may the continuity of research be assured. These studies to a great extent will enter the so-called field of business. They may affect practices of long standing and hence must have the strongest practicable backing of the Federal government and State if they are to succeed.

To return to the specific question under discussion, it is my opinion that the following principles should be observed.

(1) Further funds should be provided by Federal legislation, if possible by amendment or expansion of the Hatch Act, that would at least double the present appropriation to the several States and that would thereafter provide increases of Federal appropriation by sums of \$10,000 per annum to be supplemented by equal appropriations from the State until the total Federal appropriation would equal \$85,000 in each State. Such appropriation should not, however, carry with it greater Federal control than is now embodied in the Hatch Act.

(2) The amendment, or new act if necessary, should be so broadly worded that it would make possible the inclusion of the field of economic and social science as applied to agriculture.

(3) Such proposed investigations should not be separated from or impair the progress of the research in the physical and biological field. Rather they should be coordinated with present investigations. In other words, stations should be in a position to use these additional funds in any fields of research or of trial that seem desirable. The act, however, should specifically provide that economic and social research as applied to agriculture may be developed. The total amount available for research should be increased and stations may be trusted to meet the new developments as finances permit.

Finally, if funds may be rendered available we have before us a tremendous problem. Few men, comparatively, are prepared to exert leadership in the fields under discussion. Growth will naturally be slow. Men must be educated and developed. The methods of research must be considered and practices worked out. This will require time and patience. Finally, with a proposed program for securing funds should not a broad inquiry be inaugurated to determine the present and future program of experiment stations and the fields they will cover?

R. W. THATCHER. Earlier discussions have clearly shown the need for additional, stable financial support for agricultural research.

This additional support should be sought first from Federal appropriations, for two reasons. First, there is the fundamental reason that the results of agricultural research are of nation-wide application and benefit, and lead to increased wealth and happiness for all the people. Agricultural products are grown for interstate or international use. The people of many of our States are largely dependent upon the products of the farms of other States for their food, clothing, etc. Hence, it is right that Federal funds should be available for the support of this work. In the second place, agricultural research is peculiarly long-time and continuous in character and provision for its support ought to be made such as will secure it from frequent temporary fluctuations in popular whims or legislative emergencies. The Federal Congress has established the principle of continuing long-time appropriations which (while they may, of course, be modified by Congress at any time, by repeal or amendment of the original act) have all the moral force and effect of permanent endowments for agricultural research and permit constructive planning of such research.

The additional support to be now requested from Congress should, I believe, be in the nature of an amendment to the original Hatch Act such as would increase the funds available for use for the purposes, and under the conditions, laid down in that act. We all keenly appreciate the benefits which have accrued to agricultural research from the operation of the Adams Act. The limitations which are set upon its expenditure have served admirably to promote better organization of research projects and have splendidly improved the type of work done on these projects at the several State stations. The character of the agricultural research of the country has been brought to a higher plane by the assistance given under the administration of the Adams funds. In this way, the weaknesses of station work in its earlier days under the support of the Hatch funds alone



have been largely overcome. But to provide that further Federal support should be on the basis of the Adams Act, with its restrictions as to types of problems to be investigated and limitations of expenditures to research only, with no provision for acquisition of increased physical plant equipment, for publication of results or of demonstrating their applicability under special local conditions, would lead the experiment stations into the embarrassing situation of having to secure State support, not so much for research work as for expenses of their routine administration, publication, etc. We would have to go before our State legislatures with requests for appropriations for phases of our work which superficially appear to be unworthy of Federal support. We have the Adams fund with its continuing beneficial influence upon the character of station research work, and would welcome an increase in the funds available for expenditure under it; but I believe that greater good would now come from an increase of the funds available under the original Hatch Act, with its greater flexibility in adaptation to "the needs of the respective States".

Next, I believe that the added funds should come in regularly increasing increments over a period of years, rather than in an immediate large increase in one lump sum "step-up". We are all familiar with the difficulties which arise from inadequately prepared workers to take up work for which large Federal funds are available. We have just been through the experience of war-time expenditures, and are now experiencing the inevitable reaction from them. What we should have is an initial increase which will approximately bring the Hatch fund back to its original purchasing power for men and supplies, followed by annual increments which will provide for reasonable normal growth during the next few years. The suggestion of an additional \$15,000 for the first year with annual increments of \$10,000 for seven years thereafter, to each State, seems to me to be admirably adapted to the needs of the situation.

Next, I think the principle of making this increased appropriation available only to those States which provide out of State funds an equivalent sum to be expended for the same purpose, is sound in principle and feasible in practice. It insures that those States which need, and recognize the need for, additional support for agricultural research may get it. While there can be no doubt of the nation-wide, or international, benefits from appropriation of Federal funds for its support, the success in getting these results promptly into practice in actual farm operations depends largely upon local understanding of and interest in the work of the State experiment station. Hence, the local State agencies ought to participate in the support and understanding of the administration of the experiment station research work.

Finally, I recognize that not all States have equal possibilities of taxable wealth upon which to draw for the support of this work. It seems that the plan and sums mentioned above as adequately meeting the situation in an average State may be beyond the possibilities of some States to meet. Hence, the suggestion that the individual States be permitted to determine whether they will accept the whole or only a part of the funds to be made available under the proposed plan, seems to be a wise one. This would involve no serious difficulty of administration, either nationally or locally, and would provide a plan which would adequately

adapt the principle of joint Federal and State support to the varying needs and possibilities of the several States.

I have had occasion, recently, to inquire into the systems of public support for agricultural research in other countries, particularly in the English colonies. I am convinced that the plan which we are now discussing, namely, that of joint Federal and State support, is far ahead of any other known system in its possibilities of providing for stable support and proper local appreciation of, and interest in, agricultural research.

Miss Edna N. White, Michigan Agricultural College, discussed the subject from the point of view of having home economics research included in any increased Federal appropriation for agriculture.

A general discussion followed. It was moved and carried that the recommendations embodied in Dean Burnett's paper be approved and transmitted through a committee to the general session.

The next paper was presented by F. D. Farrell, Director Kansas Experiment Station, as follows:

#### SOME PRACTICES WHICH HELP TO POPULARIZE EXPERIMENT STATIONS AND THEIR WORK

BY F. D. FARRELL

Many of us were surprised to learn at the Chicago meeting a year ago that the aggregate amount of funds appropriated by the States and the Federal government for the support of State agricultural experiment stations for the preceding fiscal year was virtually no greater than the annual pre-war appropriations. When we consider the decline in the purchasing power of money since 1914, it is obvious that the experiment stations have much less financial support now than they had six years ago. One result of this reduced support is a decrease in the quantity and quality of station work, and another is a feeling of grave apprehension for the future of the experiment stations themselves. It is certain that these institutions must deteriorate, perhaps actually decay, unless they can secure more nearly adequate financial support. Moreover, it seems clear that their neglect in this connection is due largely to a general lack on the part of the public of an understanding of the experiment stations' functions and of appreciation of their value; in other words, to a lack of popularity.

For a time it was believed by some that the development of agricultural extension would in itself popularize experiment stations and their work. This has not proved to be the case. Speaking generally, the extension agencies, dependent themselves on State and Federal appropriations, are too busy popularizing their own activities and safeguarding their own financial welfare to give any considerable attention to popularizing the station work as such. It seems clear that if the stations and their work are to be popularized, the stations themselves must attend to the matter. This may be extremely regrettable, especially to the investigator, who feels the need of all the time there is and complete freedom for his scientific work. But to satisfy this need completely does not seem practicable in all cases. It seems certain that station workers must not only conduct experiments and prosecute research, but that many of them must help to

build up and maintain the sources of support of these activities. The principal ultimate source of support is popularity, composed chiefly of public sympathy, interest, and understanding, with reference to the experiment stations.

The following are a few of the important facts which have a bearing on the question of popularization of experiment stations:

(1) There are perhaps millions of farmers in the United States who cherish important misconceptions regarding experiment stations, their functions, their achievements, and the character and value of their service.

(2) Relatively few farmers recognize the fact that the State experiment station is a form of agricultural cooperation, through which each farmer in the State may obtain great service in return for a negligibly small annual contribution, included in his taxes, and the policies of which he may help to shape if he so desires.

(3) Each farmer is likely to measure the value of his State experiment station in terms of its direct service, actual or prospective, to him as an individual, and not in vague terms of service to the State as a whole, or to the United States, or to agriculture in general. Nothing influences him more favorably than to get exactly what he wants when he asks the station for information for which he has a practical need.

(4) Some station workers, through a spirit of aloofness or indifference to the public or to individual farmers, actually retard the popularization of their stations, or even contribute to the development of hostility. In this connection, it is to be remembered that we are employed by the public to give it service, and for no other purpose.

(5) As consideration of the experiment stations can occupy only a very small part of the thought of the public, popularization of station work cannot be built up in a short time, or by means of a "campaign", and then be left to take care of itself. It must result from a continuing general policy.

It is significant that some of the experiment stations are much better supported than others. And one doubtless would be justified in assuming that a station which regularly receives relatively adequate support is relatively popular. At any rate, that assumption has been made in the preparation of this paper. Moreover, the suggestions made herein are chiefly descriptive of practices actually followed by certain experiment stations (and sub-stations) which enjoy a fair degree of popularity with their respective constituents and which have been reasonably well supported for years. Not one of these suggestions is new, but on the other hand, few of them are universally followed. Perhaps no one of these stations follows all the practices mentioned, but each of the practices is known to help to popularize the stations which follow it.

In considering these practices, it should be remembered that a station's reputation, or the degree of its popularity, is a result of many things, most of them small in themselves. Some of the same general principles apply here as in the case of a department store or a railroad, which builds up and maintains a popularity by years of continuous careful attention to many details in its dealings with its patrons.

There are two principal regular forms of direct contact between an experiment station and its constituents. These are correspondence and personal visits. The ordinary constituent, especially if he be a farmer,

is super-sensitive to the impressions he gets in either case. Long delays in replying to inquiries from people seeking agricultural information, or carelessness, disrespect, or sarcasm shown in replies are certainly responsible for some of the mistrust in the minds of the public with reference to experiment stations, and for some of the lack of interest in their work. Most farmers neglect to send an inquiry to an experiment station until the need for a reply is pressing. Hence, delay in answering is likely to cause disappointment, or even antagonism. Those stations which are habitually prompt, courteous, and helpful in their correspondence with their constituents are certain to make friends, and are more likely to popularize their work than they otherwise would be. To understand this fact it is necessary only for a station man to imagine himself in the place of a farmer with a crop or some livestock threatened with serious loss from some disease or pest with which he is unfamiliar. The constituents of an experiment station are entitled to prompt, courteous, and, as nearly as possible, adequate replies to their inquiries. For a station to neglect this matter is to overlook a good opportunity for making itself popular.

It is not as uncommon as it should be for an experiment station worker to look upon an ordinary visitor as a nuisance, and to get rid of him as quickly as possible. And yet we have potentially in our visitors our best popularizers. The farmer who spends a day at the experiment station and who departs with a good general understanding of what the station is for, a clear idea of the practical value of some of its work, and a feeling of sympathy and enthusiasm for the institution, will do as much as any other one thing to popularize the station among his neighbors. The opportunities afforded by the personal visit for increasing public understanding and appreciation of the experiment station and for extending the station's usefulness are very great. This is a matter which receives sympathetic and active attention by the most successful stations. The visitor should be regarded as a stockholder in the enterprise, which he is; as a carrier of information regarding the station, and as a defender of its interests.

A form of contact somewhat less direct than correspondence and personal visits, but nevertheless having great possibilities for popularization, is that in which the achievements of the station are set forth in newspaper articles. Although most of the stations pay a good deal of attention to this matter, its possibilities are far from being fully utilized. There are relatively few people in the country who never read newspapers, and thus the newspapers give us our largest audiences. One difficulty which is yet to be surmounted is that many of the newspapers refuse to print experiment station articles unless the latter contain chiefly human interest or sensational matter. We have yet to find a satisfactory meeting ground for newspaper editors and experiment station people, a basis on which reports of station work can be made truthfully, and at the same time with sufficient popular interest to appeal to the average editor. Advancement is being made in this connection. It is likely that progress will be accelerated when experiment station workers develop an increased interest in the importance to their work of the right kind of newspaper publicity. This probably will require that a great many more station workers than at present will themselves write newspaper articles about their work. Some experiment station departments require that each member of their staffs write a certain

number of newspaper articles each year, describing certain features of their work and explaining its significance, usefulness, and possible applications. This practice has had some excellent results. Whatever the solution of the problem may be, the fact remains that newspaper articles, if well written, timely, and interesting, constitute an important opportunity for further popularizing the experiment stations.

One of the most common misconceptions regarding experiment stations is that they are not practical; that their work is of the "parlor" variety. This impression is encouraged in the minds of the uninformed by the presence at a station of tenth-acre plots, nursery rows, and other miniature things necessary in station work. This misconception, which frequently leads to contempt, is not easily corrected. Some stations have gone far in overcoming it by including in their operations what might be called commercial features. These latter include regular production of commercial quantities of such things as grain, pure seed, fat stock, breeding stock, milk, and fruit for sale in the open market. These commercial operations have helped several stations and sub-stations tremendously. If they are successfully carried on, as they can well be, they are very influential in convincing the skeptical that station men are not necessarily amateurs. Moreover, these operations are used effectively in explaining to the visitor the importance and value of experimental and research work; the relation between the test tube or the nursery row and the 500-acre farm. These commercial operations have an incidental but very important value in that they help to keep the investigator's feet on the ground.

It needs to be remembered, of course, that the practice of including commercial operations in the station's activities can easily be overdone. It has been overdone at times at several stations, as is well known. So long as the practice is followed conservatively and held in its proper relation to the regular station work, it can be made very helpful.

Another group of practices which have been fruitful are those which invite the public to participate actively in something at the experiment station. These practices include picnics or other gatherings, either of a general character, or by such groups as the Grange, the Farmers' Union, the Farm Bureau, breed associations, and commercial and industrial organizations. Occasions of this kind, whether designed for pleasure or for business, bring large numbers of farmers and other people to the station, where they learn at first hand of the institution, its staff and its work. This helps to break down the insulation which commonly separates the station from large numbers of its constituents. Another very helpful practice in this same general class is the holding of the annual Feeders' Day and the annual Field Day, which recently have become popular, especially in the Middle West. Other occasions of the same general character include public sales of purebred livestock, farmers' conventions, boys' and girls' club excursions, and inspection tours by county or State farm bureaus. The fundamental value of all these lies in their influence in promoting acquaintance between the public and its servants—the experiment station and its staff. This acquaintance produces most gratifying results in the shape of mutual sympathy, understanding, and respect. It helps to correct the unfortunate attitude of detachment frequently held by station workers and to convince the public that sound research and experimental

work has a most intimate bearing on the things in which the public is vitally interested.

One of the oldest methods of popularizing station work, and yet one which is far from fully utilized, is the making of exhibits at fairs. Thousands of people regularly visit State and county fairs who seldom or never visit the experiment station. Large numbers of them go to the fairs seeking new suggestions. The crowds of fair visitors which gather around a new piece of machinery or a striking and attractive exhibit of the results of experiment station work evidence this fact. One difficulty about many station exhibits is that they are stereotyped and perfunctory; frequently out-of-date or threadbare. There is good reason to believe that the effectiveness of the long-used practice of making exhibits at fairs can be greatly increased, if more ingenuity, thought, and enthusiasm are devoted to it. The basis of this suggestion is the fact that at fairs the constituents of the experiment station congregate in greater numbers than anywhere else, and that they visit the fairs largely for the purpose of getting new ideas and suggestions which can be applied in agricultural practice.

An extremely helpful thing which has been developed by a few of the experiment stations is the practice of prosecuting, in cooperation with some public organization, a definite piece of work based on some specific achievement of the station. This practice includes such activities as those of the experiment associations in some of the States, and the Crop Improvement Association in Kansas. Each of these organizations undertakes one or more specific tasks in close and continuing cooperation with the experiment station. For example, the Kansas Crop Improvement Association for several years has been cooperating actively and effectively with the Kansas agricultural experiment station in popularizing an improved variety of winter wheat. Working together in this task has developed between the experiment station and the members of the Crop Improvement Association a very sympathetic and friendly feeling. Both parties to the enterprise are frequently confronted by difficult problems, and joint action in the solution of these problems is extremely helpful. Any experiment station can consider itself fortunate if its work has produced one or more specific things which it can introduce into the agriculture of the State through cooperation with some organization. The possibilities of such cooperative action, both with reference to the popularization of experiment stations and in extending and improving the services which these stations render to agriculture, have scarcely been touched. In future the work of the stations should include largely increased activities of this character.

It goes without saying that if an experiment station is to enjoy continued popularity, its work must be substantial and constructive. Furthermore, the stations need to have their work well balanced. A station's work may be out of balance with reference to the agricultural problems of its territory, or it may involve a disproportionate amount of pure research—too much or too little—in relation to the activities which produce immediately applicable results. There needs to be a fair balance between the relatively superficial and the truly fundamental. A station needs some work which produces a constant flow of results for immediate application, like winter feeding tests, or crop variety tests, and some other work which seeks more fundamental results, like research in nutrition, or in soil fertility. The first kind of activities are useful in serving immediate needs

and enlisting immediate popular attention, and the second kind help to safeguard the future. Each kind of work is necessary, both in rendering service and in stimulating and sustaining popular interest.

The stations might well go out of their way more than they do to explain to their constituents what the experiment station is for, what it does, how it does it, what great practical value the results have, and how small the cost is, either when considered by itself or in relation to the value of the station's work. In considering this, one immediately sees that the experiment station is an agricultural cooperative enterprise, and that, like all successful cooperative institutions, it renders great service for a comparatively insignificant financial outlay. The State stations of the 48 States last year used about \$4,000,000 of State and Federal appropriations, or an average of about 60 cents per farm in the United States. When we consider the fact that the farmers of the country probably pay much less than half of the total taxes, the average cost of the State stations per farm last year did not exceed 25 cents. A farmer in Kansas showed me the other day how the application, on ten acres of his land, of one thing he received from the experiment station last year made him enough money to pay his share of the State appropriation to the experiment station for 833 years, assuming that the appropriation would be continued at the present rate, which now costs the average Kansas farmer 36 cents a year. That man naturally has a friendly feeling for his State experiment station. Thousands of other farmers in the different States have been equally benefited by the work of their State stations, but relatively few of them have happened to think or been made to think of the benefits in this light. This suggestion illustrates another effective method of popularization.

In these times, when all the world is surfeited with misinformation and selfish propaganda, one likes to think that the agricultural experiment stations will adhere strictly to the truth, regardless of politics, factions, selfish interests, and expediency. It is inspiring to think of these institutions as "sticking to their lasts"; as persistently struggling to maintain and strengthen their positions as institutions which are actuated solely by a desire to discover and honestly interpret facts and to publish them. The more nearly and the longer the experiment stations do this, the more the public will look to them as sources of unprejudiced, uncolored, and absolutely reliable agricultural information. This, after all, must be the foundation of any lasting popularity the stations will ever have.

However irksome it may be to station people to take the pains consciously to popularize experiment station work, the necessity of doing it seems inescapable. To secure the desired popularization requires the devotion of time, effort, and money to activities which are in no sense experimentation or research. If these activities are neglected we cannot be sanguine about the future of our experiment stations. We are confronted by facts which may be distasteful to many of us, but our duty as servants of American agriculture is perfectly clear.

It is doubtful whether the American people ever make a better investment than they make when they appropriate funds to support agricultural experiment stations. But this fact is unknown to most of the people for whom and by whom the stations are maintained. We need to take advantage of every opportunity to impress the public with the facts. This probably cannot be done by any single method. It requires, rather, the

practice of a number of methods, each of which will contribute to the general result. When each station convinces its constituents that it is a profitable investment, that its service is worth many times its cost, it and its work will be popular. The public can be relied upon to support an institution which it is convinced it wants.

F. S. Harris, Director Utah Experiment Station, presented the following paper:

#### STATE CAMPAIGNS FOR STATION FUNDS

By F. S. HARRIS

The State may legitimately expect a return of many dollars for every dollar wisely spent in agricultural research. Probably no form of investment yields more far-reaching returns than the money used in the solution of the problems growing out of the cultivation of the land. The welfare of all people is dependent on the prosperity of agriculture; it is not the farmers alone who benefit from agricultural advancement. Those engaged in all the occupations are affected.

We shall therefore take as premises: First, that the State as a whole will be benefited by improvements in its agriculture; second, that the best way to improve agriculture is through the discovery of all possible facts affecting it; and third, that it is the duty of those charged with the administration of experiment station work to see that the State spends an adequate portion of its means investigating the problems of agriculture. The end is sufficiently important to justify the use of almost any means.

In order to find out the methods used in the different States to secure appropriations for experiment station work, a questionnaire was sent to the various station directors. An examination of the 41 replies shows that practically every station has to depend on legislative appropriations made at each session. In some States the legislature meets every year, in others only once in four years; but in most of the States it meets once in two years.

The most surprising thing in the replies was the great diversity of point of view held by various directors and the lack of uniformity in methods of meeting the problem. In some institutions the officials seem to feel no particular responsibility for getting funds. They take the attitude that if they spend properly the money the legislature sees fit to grant them they have done their full duty. They concern themselves with spending money but not with getting it.

In other institutions the officials feel bound to leave unturned no stone that will help them to enlarge the funds appropriated for experiment station work. In several States the direct responsibility for meeting legislators is not taken by the station but is left to farmers' organizations and other agencies that are interested in agriculture.

No less variable than the methods used are the results obtained. Some stations are liberally supported, whereas others receive practically no State aid. As might be expected, the richer States are the ones usually giving the largest sums, but the support is by no means proportional to the resources of the States. Some States that are very rich in agriculture give sums that are almost too small to be considered, while some of the comparatively poor States have supported research very generously. We



must therefore look for causes other than physical resources of the States to account for the difference in funds available to the various stations.

Probably the chief cause for these variations lies in the general indifference toward the work on the part of the people of some States and the lack of interest on the part of legislators and State officials generally in research. They are not converted to the value of this type of work. It seems probable, however, that the taxpayers are not entirely responsible. Doubtless the agricultural colleges and experiment stations themselves should come in for part of the blame. The gospel of better agriculture will spread itself but slowly. Its rapid adoption requires active missionaries. These must come in large measure from the institutions. The work must be "sold" to the people before they understand it and before they are willing to give it full support.

Station work as a class is not likely to be well understood by the public while it is in progress. It is very different from extension work or college teaching in this respect. These latter activities from their very nature quickly bear fruit in the minds of the people, whereas the investigator often requires years of patient toil before his results are available for practical use by the farmer.

Men engaged in research become so interested in the solutions of their problems that they often lose contact with things human; and anything in the nature of publicity becomes distasteful to them. They are often disgusted by propaganda that seems unjustified, and as a result they are likely to become even less willing than ever to exploit their own discoveries.

These conditions combine to keep experiment station work less before the public eye than extension and teaching activities. This in time is sure to be reflected in decreased appropriations for research, hence decreased usefulness, unless those who are charged with the administration of experiment stations adopt active and vigorous means to meet the situation. The experiment stations will not remain well-supported institutions unless positive efforts are constantly made to interpret them to the people; for ultimately it is the people who disburse public funds.

Since it seems evident that the stations must do something more than sit passively by hoping that they will be taken care of, the question arises as to just what can and should be done in the matter. It will of course be evident that exactly the same methods cannot be used in all States. Problems differ in various parts of the country; likewise, the temper of the people is not the same everywhere. The appeal must be presented from different points of view. The methods given here should be taken as only suggestive. They will need to be modified to meet the special conditions found in each State.

The quality of work must ultimately determine the support received. Unless results justify, continued appropriations cannot be expected. Those who are interested in securing continued appropriations must look first of all to the work itself to see that it justifies what it costs. If it is up to standard its value will ultimately be recognized, but in the meantime expenses are going on and it may be necessary to resort to special means of securing funds until the real value of the work is understood.

It seems to me that the first step toward securing adequate support is to have complete harmony in the institution itself. Most experiment stations of the country are connected with agricultural colleges. Blanket

appropriations are in some cases made to the college as a whole and the funds are subdivided among the departments by the officers of the institution. In this case the proportion of the funds devoted to research is entirely in the hands of the institution itself. More often funds are appropriated directly to the experiment station specifically for its work; but even in this case the chief executive of the agricultural college has a voice in saying what funds shall be requested from the legislature for each purpose. It is thus apparent that research is more likely to fare well if it is in good standing in all parts of the institution. Its importance must be recognized by teaching faculty and extension staff as well as by those engaged directly in experimentation. All forces must be in full harmony and must be thoroughly sympathetic with investigation if it is to maintain its proper place. The director's first task in his campaign for experiment station funds is to get the cooperation and support of all divisions of the institution with which the station is affiliated.

Since the chief purpose of the agricultural experiment station is finally to be of service to agriculture, it seems logical that the agricultural interests should be its chief support. Certainly if those who are to be benefited are not willing to aid, others cannot be expected to do so. Enlisting any large support directly from individual farmers is not practical since too much energy is required to secure results. The energies of the station can be used much more effectively through organizations. Agricultural societies, farm bureaus, the Grange, and various other farmers' organizations may exert a powerful influence on legislatures in favor of the station.

In some States the station makes no direct appeal to the legislature. It simply tells its needs to the organizations which in turn follow the matter through the legislature. While this is probably a more extreme use than can be made of these organizations in most States, the general method of attack may be useful everywhere.

The publications of an experiment station are about the best index of its activities. These may include not only the bulletins, reports, and circulars published by the station itself but also papers reporting research in technical journals or articles in the more popular periodicals.

A station cannot hope to retain support from State funds unless it publishes material that will indicate to the people that the work carried on at the station will have either direct or indirect value to agriculture. The director who is wide-awake will devote much thought to the question of publishing the work of the station.

The individual investigator is likely to be so immersed in the intricacies of his problem that he almost forgets the general public. His best thought is given to the solution of his problem and to the technical presentation of his solution. He does not want to take time to popularize his findings.

Often results that have required years of time and many thousands of dollars to obtain are published in so unavailable a place that scarcely a dozen farmers in the State learn of the work, and even if they do see the paper they are unable to comprehend its significance. This condition makes imperative some sort of interpreting agency in the station. The public is entitled to know what its money is being spent for, and it is unable in many cases to find out first hand unless the more technical reports are translated into language that they can understand.

Many devices for bringing this about are practised in the various States. Popular editions of technical bulletins, summaries prepared especially for newspapers, articles in farm journals, farmers' institute lectures, and many other similar means are used. It seems to me that the station executives should at some time have a full discussion of this question, since it has such vital relationship to the support the stations receive from the State.

Numerous news items regarding the station and its staff can be used effectively during the year. The public is interested in news concerning its servants. Support is more likely to be given if there is evidence of something being done. The idea of action is probably best conveyed through news.

Some stations have found it advantageous to issue special publications designed particularly to increase appropriations. These may make no attempt to report experiments but are primarily statements of general facts regarding the station, its equipment, its work, and its outlook. These publications are most effective when well illustrated and are often presented as a sort of visit on the part of the station to the people, since the people cannot all visit the station.

One effective means of informing limited groups concerning the station is through excursions. While these are usually excellent in their effects, they are limited by the fact that comparatively few of the people take advantage of them.

It seems to me that in addition to the general effort to inform the public regarding the work of the station a special attempt should be made to keep State officials who have to do directly with appropriating and administering State funds well in touch with what the station is doing. This may mean a special mailing list of State officials so that they will receive all regular publications of the station as well as all popular summaries and reviews of technical station work and such special material as they may be interested in.

State officials are only human, and they are likely to look with most favor on those branches of the State service from which they receive recognition. It would seem that it is worth while to take advantage of the psychology of this situation and see that legislators and other officials of the State maintain a friendly attitude rather than a hostile one toward the experiment station and its work.

This condition will not be realized unless much thought and work are given to the question. It will be necessary for the director or some agency he may designate to be alert for material that will make a special appeal. Many legislators, being practical men, are likely to judge the value of work largely by its direct monetary returns. For these, it is necessary to prepare figures to show that each dollar invested in a certain experiment will eventually return many dollars not only to the farmers but also to the State treasury. They regard the State merely as a business corporation that should not make an investment that will not bring speedy monetary returns.

Other officials have other hobbies. These must be studied and taken advantage of. The technical staff should not be diverted from their researches to do this work which should probably come rather immediately under the supervision of the director.

Some of the more straight-laced investigators may think that resorting to these various means of securing State support for research is not dignified, for surely "the laborer is worthy of his hire" and the great subject of science should not have to compete so vigorously for funds with the more material phases of the States' business. It must be remembered, however, that most of those who appropriate funds are men of practical business and are not scientists. They must be converted to something about which they know very little, and their conversion must be brought about by the agencies that are at hand. Each one cannot be given a special course in experimentation but must get his information in a short time through the somewhat superficial channels to which he is accustomed.

When we remember, however, that it is our duty as experiment station executives to see that our staffs are supplied with adequate means to carry on their work, and when we realize that the State is going to be benefited to the extent of many dollars for every dollar spent in agricultural research, we may well discard some of our modesty and take up with vigor the campaign for enlarged State support for the experiment stations.

Let our light so shine that the State seeing our good work will gladly pay for its continuance.

The subject of increased appropriations for agricultural research was discussed by W. H. Chandler, Vice-Director New York Cornell Experiment Station, as follows:

#### ORGANIZED ASSISTANCE OF FARMERS IN SECURING INCREASED APPROPRIATIONS

BY W. H. CHANDLER

It is the purpose here to report a method used by the New York State College of Agriculture to secure additional appropriations. At this college it has never been the custom in advance of the time of expenditures to separate funds for research from those for teaching activities, except in the case of Federal funds. This discussion must therefore deal with the college as a whole.

While the appropriations for the maintenance of the New York State College of Agriculture have in recent years been rather large, yet considering the demands made upon the college it has been difficult to secure adequate funds.

The student enrollment is large, and because of the many highly specialized agricultural industries in the State students must have an opportunity for a highly specialized training. The specialized farming makes very diverse demands upon the extension and research activities of the college. A very large staff is, therefore, imperative.

The State, however, is compelled to maintain many institutions, and the annual appropriation has become so large that the State is faced with a serious problem, and requests for increased appropriations are sifted rigorously. Appropriations for maintenance of the State College of Agriculture had become inadequate, nearly all departments were crowded into insufficient space, and the outlook was not promising to secure salary increases that would make it possible to keep the staff together, to say nothing of bringing the salaries to the point where they would have their pre-war purchasing power. The dean presented the budget with a salary

scale that seemed all that it was possible to secure. The building needs of the college had been studied, and they were so large and so urgent that considering the greatly increased cost of building it did not seem possible to secure at once appropriations large enough to prevent a serious handicap to the work of the college.

Under these conditions it seemed wise to bring the situation to the attention of leading farmers, and to learn from them what they expected of and for the college. Accordingly a separate group of farmers was invited to visit each of the departments. Officers of societies representing the type of farming in which a department interested itself were invited, whether they had shown friendship for the college or not. Others were invited upon the recommendation of the officers of the larger farmers' organizations and editors of agricultural papers, and others upon the recommendation of the department concerned. Groups to visit a number of the departments were invited for the same day, so that the time of the dean and the staff could be economized. Each group was asked to elect a chairman and a secretary. The meeting was theoretically under the control of the visitors. They saw all of the activities of the department and all of its equipment. They were asked to make recommendations for the department studied, as to how it could better serve the State.

The chairman and secretary of each group represented that group in a general meeting held after all of the 24 departments had been visited.

This in brief was the plan followed. The interest of the farmers was certainly all that could be wished. A very large percentage of those who were invited accepted the obligation and visited the college at their own expense. They worked long hours, studying the departments carefully as to courses offered, problems being investigated, and extension activities. They showed the greatest interest in research. In fact, when they discussed extension activities they always talked of things they wanted the college to learn for them. They were not interested merely in the outstanding spectacular features, but were interested in having both our research and our teaching go to roots of things. They seemed as much interested in the fundamental departments like botany as in the others. So far as I know the salaries of the staff were not mentioned by any of the departments, and yet, on account of the difficulty of holding men, many of the groups stressed salary increases. I am certain that all the departments secured valuable information as to the farmer's point of view, and some of us secured valuable technical information.

When the general group made up of officers of the specialized groups met, the men again paying their own expenses, they brought in among others the following recommendations.

(1) That the building program as outlined in the summary of recommendations attached to and made a part of the report of the dean, be approved and adopted as the program to be presented to the legislature. (This program enumerates the buildings required, estimated to cost at present prices upwards of \$5,000,000.)

(2) That the legislature be asked to appropriate in 1920 the sum of \$2,000,000 to start three large buildings in the following order: Plant industry, rural engineering, dairy industry; and it recommends also that any part of this appropriation not needed for the above-named buildings should be available for other buildings most urgently needed.

(3) That the legislature during the session of 1920 be asked to authorize the drawing of plans to cover the remainder of the program as

recommended, and that the legislature be asked in 1921 to appropriate funds to start all other buildings provided for in the committee recommendations.

(4) That the "budget system" be changed so that, while the proposed expenditures shall be itemized in detail, appropriations shall be made under general classifications only, such as (1) personal service, (2) maintenance, and (3) repairs and replacements; that the administrative officers in charge of the institution be given the power of distributing the available funds granted under these general heads; and that this recommendation should apply to all State educational institutions.

(5) That the dean of the New York State College of Agriculture should be further relieved of detailed administrative duties, and to that end we recommend that a vice-deanship of resident teaching and a vice-directorship of research work be created.

(6) That the following salary scale be recommended as a minimum: For heads of departments, \$5,000; for full professor, \$4,000; for assistant professors, \$2,500; for instructors, \$1,500; for assistants, \$800; for stenographers, \$900.

(7) That, whereas the small increase asked for by Dean Mann is the budget for 1920-21 will be wholly inadequate and will furnish no relief such as we desire, the salary estimates submitted by Dean Mann for the fiscal year beginning July 1, 1920, be revised in accordance with the minimum scale heretofore recommended, and that the changes in the salary scale recommended by the committee become effective for the fiscal year beginning July 1, 1920.

(8) That the staff of the college be developed to meet the expansion approved by the several committees which have made studies of the needs of respective departments, and that the executive committee of this general committee make more detailed and specific studies and recommendations toward developing the work of the respective departments and toward adequate funds for maintenance.

The officers chosen seemed very quiet and unexcited, but they proved very effective. The building program recommended was authorized by the legislature in so far as the State architect may find it necessary adequately to house the college, making due allowances for growth. The dean presented a revision of the budget previously presented. This did not bring salaries up to the recommendations of the farmers, but it provided rather large increases, and, with the aid of the executive committee of the above-mentioned farmers' group, they were put through the legislature. An example of the effectiveness of this committee is shown in the case of the provision for a vice-director of research. The finance committees of the legislature, opposed to new positions because of the necessity of increasing existing salaries, refused the dean the inclusion of this one. This farmers' committee, however, insisted that it be included in the budget, and it was in the appropriation bill signed by the Governor.

Unquestionably then, through the advice and aid of these farmers the college is in a much better condition materially. We think also that our work will be improved by our having compared our views with those of the farmers. And most gratifying of all is the fact that these leading farmers seem to place the interests of research first. They were far more interested in the research we were doing than in any other phases of our work.

Some may fear that this securing of farmers' support for research may have undesirable results. It is natural that progressive farmers should be aware of the benefits they have received from research activities. However, can they be made to see how slowly new truth is discovered even when equipment for the work is adequate? If farmers are to be permitted to

say what departments must receive additional support, may they not tend to throw their influence with men who are quick to proclaim new findings even though their conclusions have not been reached by means of the patient study that should characterize research workers. I can only say that farmers of New York, in so far as I am aware, have not shown that tendency.

Anyway the farmers have abundant opportunity to exert an influence in favor of a popular man or department whether their advice is sought or not. It would seem then that if the farmers' advice were definitely sought and they were shown painstakingly through the work of the college, they would be more likely to become acquainted with the difficulties of research and the dangers of premature conclusions, and would be less liable to throw their influence with superficial but attractive workers.

R. L. Watts, Director Pennsylvania Experiment Station, called attention to an exhibit of experiment station records and methods of recording data which he had collected.

WEDNESDAY AFTERNOON, OCTOBER 20, 1920

J. G. Lipman, Director New Jersey Experiment Station, presented the following report from the Committee on Publication of Research:

#### REPORT OF COMMITTEE ON PUBLICATION OF RESEARCH

##### THE ADEQUACY AND INADEQUACY OF EXISTING FACILITIES FOR THE PUBLICATION OF AGRICULTURAL RESEARCH DATA

The research papers of our experiment stations and agricultural colleges appear in the form of technical or research bulletins, as memoirs, or in annual reports and scientific journals. The different stations and colleges vary as much in their policy toward the publication of research as they do in the quality and quantity of their output. Among the station directors there is a readiness to admit that the present arrangements are satisfactory neither from the administrative nor the professional point of view.

##### THE ADEQUACY OF STATION BULLETINS

Certain reasons easily suggest themselves in support of the bulletin as the best medium for the publication of station research. It may be argued that the investigational activities of any institution retain their identity and distinctiveness best when given publicity in the bulletins or other publications of that institution. On the other hand they lose their institutional distinctiveness in national or international journals. For the sake of impressing their constituents; for the sake of obtaining more generous appropriations; as well as for the sake of preserving more effectively the record of the stations' activities the directors are often inclined to lay undue stress on the value of the station bulletin as a medium for the publication of technical and research data.

It may be argued on the other side that research bulletins are relatively costly. Their printing and distribution involve much waste that cannot be avoided. They are often sent to people who do not really need them. In

spite of frequent and careful revisions of the mailing list too many copies find their way into the waste basket. Research bulletins are not as easy to refer to as are the numbered files of scientific periodicals. This lack of accessibility becomes a distinct inconvenience, and now and then a hardship, to the research fraternity in foreign countries. Indeed, the very large number of station bulletins, the lack of uniformity in the numbering of the different series and the loss of individual publications must drive our librarians to distraction.

#### THE COST OF STATION BULLETINS

Your committee has attempted to ascertain, by means of a questionnaire sent to the directors, how much money is available for the printing of station publications. The replies received show that 33 stations have available for printing for the present year, approximately \$210,000. In at least three States the printing funds are appropriated not to the station, but to the State printer. At most of the other stations no specific amount is available, and in several instances only Hatch funds can be used for the printing of station bulletins. As to amounts definitely available for technical and research publications only 7 stations could give more or less accurate estimates. Elsewhere the amounts available are not only uncertain, but represent the scant residues of appropriations employed largely for the printing of extension bulletins. The amount reported by the 7 stations as definitely available for the publication of research and technical bulletins is somewhat less than \$33,000. An analysis of the data at hand shows that the situation is most unfortunate at the southern and some of the New England stations.

When asked the question, "Have you funds adequate for the publication of research papers?", 30 stations replied in the negative, 10 sent an affirmative answer, and 2 stated that their printing funds are adequate at present, but will not be later on. No definite answer was received from 7 stations. On the whole it seems safe to answer that at least three-fourths of our stations are inadequately supplied with funds for the printing of research data, and that most of the others will face the same situation in the near future.

In reply to the question, "How much more could you use profitably?", amounts ranging from \$500 to \$15,000 were suggested. The amounts most frequently mentioned were \$1,500—\$3,000—sufficient, possibly, for the printing of three to five good research bulletins. In view of the fact that some of our stations publish annually as many as 20 to 30 research papers, the conclusion is inevitable that our research workers no longer consider the station research bulletin as the most suitable medium for the publication of their research. Direct evidence on this point is furnished by the stations directors, as well as by the contents of certain of our scientific journals. Of 44 station directors who answered the question, "Do you favor the publication of station research papers in technical journals?", 37 approved of this method of publication. With one or two exceptions, those who wrote in the negative represented stations whose output of research is not large.



## VALUE OF SCIENTIFIC JOURNALS FOR THE PUBLICATION OF STATION RESEARCH

The members of our station staffs have published papers in a large number of scientific journals. The record of the past five years shows that contributions have been made by them to nearly 100 periodicals of this type. Prominent among them are those devoted to the interests of chemistry and of the biological sciences, notably botany, entomology, bacteriology, pathology, genetics and zoology. The station workers have also contributed very large numbers of popular and semi-popular papers for publication in trade journals, semi-popular periodicals and farm journals. Among the scientific journals used freely by our stations mention may be made of the *Journal of Agricultural Research*, the *Journal of Industrial and Engineering Chemistry*, *Soil Science*, *Journal of Bacteriology*, *Genetics*, *American Journal of Botany*, *Journal of Economic Entomology*, *Journal of Dairy Science*, *Phytopathology*, *Journal of the American Society of Agronomy*, *Science*, *Entomological News*, *Journal of Parasitology*, *Journal of Experimental Zoology*, *Journal of Biological Chemistry*, *Journal of Morphology*, and several others. An incomplete list of scientific, technical, semi-popular and popular periodicals used within the past five years by our experiment stations is appended to this report.

The dependence of station workers on scientific journals for the publication of their research data naturally leads to the question as to the nature and financial support of these periodicals. As we look into the matter we find that some of them are supported entirely or in part by our colleges or universities, some by groups of scientific workers and some by scientific societies. In many cases this support falls as a heavy burden on individuals or institutions. Very often the financial support is not adequate and the facilities for the publication of papers of a certain type far from satisfactory. Your committee feels that the experiment stations have a vital interest in these periodicals, and that as research institutions they cannot escape the moral responsibility of helping to secure suitable support for them. It would be well to look into the future in order that we might anticipate the growing momentum of American station research and provide for the prompt and effective publication of such research. The journals of the present day will need to be enlarged, and new journals will need to be established. This may be best accomplished after a careful survey of the field and by clearly defining the directions in which our research activities are most likely to develop.

## JOURNAL OF AGRICULTURAL RESEARCH

This journal is the child of the United States Department of Agriculture and of the Association of American Agricultural Colleges and Experiment Stations. It was established in response to the growing demand for a more adequate medium for the publication of the research papers of the two organizations. Since 1913 there have been issued 18 complete volumes and the 19th volume is now being completed.

The journal rapidly gained in popularity both in the department and among the stations. From 970 pages in 1913-14, and 1,093 pages in 1914-15, there was an increase to 2,234 pages in 1915-16, a slight reduction in 1916-17 and an increase to 2,713 in 1917-18. After that year the Department of Agriculture was compelled to practice rigid economy in the printing of

certain of its publications. The *Journal of Agricultural Research* became one of the victims of legislative pruning. Accordingly the issues of 1918-19 and of 1919-20 have shrunk in size to about half of those of 1917-18. Other economies were also made necessary, such as the discontinuing of the printing of separates for the stations, and later for the authors.

The crowded condition of the journal is causing much dissatisfaction. Papers accepted for publication do not make their appearance for five or six months. Of papers already accepted but unpublished there are about 25 awaiting their turn, and some of them will not be printed until June, 1921.

The first volume of the journal contains no station papers. The second volume contains three station papers, or about 10 percent of the total. The proportion of station papers was about 29 percent in volume III and about 45 percent in volume IV. The following volumes contain on the average somewhat less than 50 percent of station papers. The total number of papers increased from 29 in volume I to 38 in volume IV. Volume V contains 75 papers and volume VI, 67 papers. The following volumes contain fewer papers.

The several stations have now contributed nearly 300 papers for publication in the journal. Crediting the stations with 50 percent of the papers in which the stations and the department collaborated, we find that a group of six stations, namely those of Minnesota, California, Kansas, Wisconsin, Maine, and North Carolina contributed from  $36\frac{1}{2}$  to  $12\frac{1}{2}$  papers or a total of 123 papers. The experiment stations of Michigan, Pennsylvania, Illinois, Kentucky, Utah, Iowa, Porto Rico, Montana, New Jersey, Idaho, and Massachusetts, 11 in all, contributed from 10 to 5 papers, or a total of  $83\frac{1}{2}$  papers. Each of the remaining stations contributed fewer than 5 papers, and all of them together (34 stations) only 71 papers. It should be remembered, of course, that the figures just noted must not be regarded as giving a correct picture of the relative amount of research carried on at the different stations. Some of them publish most of their research data in other journals. By way of comparison it may be observed that *Phytopathology* contains somewhat less than 19 percent of department papers, about 67 percent of station papers. The other papers in *Phytopathology* have been contributed by investigators connected neither with the department nor with any of the stations.

#### THE RELATIVE USE OF BULLETINS AND SCIENTIFIC JOURNALS FOR THE PUBLICATION OF STATION RESEARCH

Your committee has found it difficult to obtain exact information as to the number of research and technical bulletins published by the different stations within the past five years. In many instances the station directors were uncertain whether their definition of "research" or "technical" would correspond with that of the committee. However, the information as gathered and herewith presented is sufficiently correct for the purpose of this report.

There are at least seven stations that have published more than a hundred research papers and reports within the past five years. They are the California, Indiana, Kansas, Maine, Minnesota, New Jersey, and Wisconsin stations. Their average annual output has been at the rate of

about 35 research and technical papers per station. At the same time each of these stations had published, on the average, 6 research bulletins per annum.

Three of the stations have published more than 50 and less than 100 papers each within the past five years. They are Connecticut, Illinois, and Ohio. These stations have also published research and technical bulletins. The average of the papers has been 15 per station per annum, and the average of bulletins 6 per station per annum.

The group of stations comprising Florida, Kentucky, Maryland, Rhode Island, and Virginia have each to their credit more than 25 and less than 50 research papers for the five year period. This represents an annual average of 5 papers. The corresponding number of research and technical bulletins is  $3\frac{1}{2}$ .

Most of the other stations, excepting those at Cornell and Geneva in New York, have averaged two research and technical bulletins and two research or technical papers per annum. The two New York stations have depended on scientific journals less than they have on research bulletins for the publication of their research data. Their average annual output has been approximately 10 research or technical bulletins and  $1\frac{1}{2}$  papers.

In view of the facts as presented, and with due allowance for the exceptions just noted, your committee is justified in concluding that—

(1) Scientific journals are a more adequate and more effective clearing house than are bulletins for the publication of research data.

(2) The stations that publish the largest number of research papers also publish the largest number of bulletins.

(3) Except as to larger monographs the growing volume of station research will bring out in bolder relief the inadequacy of the station bulletin as a medium for the publication of research data.

#### RECOMMENDATIONS

Your committee would approve the following recommendations in behalf of more adequate facilities for the publication of station research:

(1) The Journal of Agricultural Research should be materially enlarged.

(2) There should be a more careful segregation of the papers published in the journal.

(3) A liberal supply of separates should be placed at the disposal of both the stations and the authors.

(4) After a careful survey of the field, provision should be made for the generous support of other scientific journals wherein station papers are published.

(5) Suitable provision should be made for the publication of monographs.

(6) Our leading scientific journals should be encouraged to become more broadly national and international in character.

J. G. LIPMAN,

W. A. RILEY,

R. L. WATTS,

*Committee.*

It was moved and carried that the recommendations contained in the report be approved and that particular attention be given to the items regarding the enlargement of the Journal of Agricultural Research and the greater availability of separates of articles.

The report of the Committee on Station Organization and Policy was presented by the secretary of the committee, E. W. Allen, States Relations Service, United States Department of Agriculture, as follows:

#### REPORT OF COMMITTEE ON EXPERIMENT STATION ORGANIZATION AND POLICY

##### DISTRIBUTING THE RESULTS OF EXPERIMENT STATION WORK

The mounting cost of printing and paper has made the bills for publications an increasing tax upon the experiment station resources, which in many instances has become a heavy burden. This has led to the consideration of plans for avoiding all possible waste in distributing such publications, and for more effectively placing the results of station work before those who will be especially interested in them.

The waste in sending bulletins of semi-technical character containing extended details of experiments and investigations has been variously estimated, and while impracticable to determine, doubtless amounts in the aggregate to a considerable volume. In spite of efforts to keep down mailing lists, the difficulty of discriminating, and the fact that publications are free have tended to build up large lists which call for editions of increasing size. This has led to the suggestion by a station director that the policy might be adopted of doing away with extensive general distribution, except to the official mailing list and special institutions, sending the bulletins to the general public only upon application for individual numbers. In such case announcement of new issues would be widely made through press notices or otherwise. This suggestion, together with the general question whether a plan might be devised which would relieve the difficulty, has been referred to the committee for consideration and report.

As public institutions, the stations are placed under obligation by the Hatch Act and often by State laws to send their publications to those who request them, at least within their State boundaries. The practice has been so long observed that some have come to look upon the receipt of the bulletins of their station, without requesting each issue, as in a sense a right, and regard the necessity of asking for each issue as bothersome. The stations, on the other hand, desire to reach as wide an audience as practicable of those who would be benefited by their publications, and at this juncture especially it is to their interest to maintain a close contact with their constituents.

Admitting that there has been waste under the old system, and probably would be under any system of free distribution which could be devised, there can be no doubt that the station bulletins have been a great means of education and enlightenment. It is believed that a good many persons who would make profitable use of them would fail to see them if they had to make separate requests. It is not that they are not deemed worth the effort but that it involves an attention which may be put off or forgotten. It is akin to the convenience that leads to subscribing for a magazine instead of going to the newsstand for each number. After all, the printing

cost is but small compared with the expense of developing the information on which the bulletins are based.

The difficulty with a limited distribution based mainly on request is to avoid spending more for clerical work (and possibly postage) than is now being spent on the bulletins, and further, the danger of impairing the bulletin service. The large item in the cost of a publication is the first thousand copies. To an extent, therefore, we can afford to take the risk of some waste if the mailing lists are properly guarded.

As a first step in the latter direction, the committee recommends that mailings lists be classified according to the subjects in which individuals are especially interested, where the main agricultural interests are sufficiently diversified to warrant. This has been done by many of the stations, but not all. Modern devices for mailing make such a selective distribution wholly practicable. The attempt of individuals not in technical positions to keep up complete sets of station publications may well be discouraged. The sending to the general public of technical bulletins not designed or suited to its needs should be avoided.

The committee urges the frequent revision of mailing lists to keep them alive and to eliminate individuals who have ceased interest in the bulletins. Such revisions and limitations should considerably reduce the wasteful distribution, but as a further means of restricting general circulation it is suggested that in connection with the revision cards sent out the question might be asked whether in lieu of the regular receipt of bulletins as published a notice of new issues would suffice, from which such could be requested as seemed of individual interest. The offering of this option would serve to develop the sentiment of those on the present lists. It would be less arbitrary than wholesale discontinuance of the system so long in practice, and hence could not be subject to criticism. The plan would be a compromise, and might have the effect of considerably reducing the size of the regular mailing lists, although it is not certain that it would result in decreasing expense especially when the cost of handling individual applications is taken into account. It would answer any charge that stations are wasting their publications through improperly guarded distribution.

Where such a plan is put into effect the notice announcing new issues ought, in the judgment of the committee, to be sent out promptly to make it effective and satisfactory, without waiting for several bulletins to accumulate. It could be in post card form. It would preferably contain a synopsis of the publication corresponding to a press notice or brief summary showing its character and the general results. In some cases such a notice would probably answer the requirement of many farmers, and by being sent to them regularly it would preserve the idea of personal service in much the same way that the bulletin does. Such notices, from the fact that they contained an abbreviated account of a bulletin, might perhaps be held frankable by the Post Office Department, but this could not be determined in advance.

Presumably this compromise plan would be used in connection with both the classified and the unclassified mailing lists. It could be applied to all the bulletins, or only such as the character and cost make it particularly desirable to limit in distribution. For example, emergency or other matter which it was important to spread rapidly to enable quick action

could be made an exception and distributed directly to the mailing lists. There would be a saving in regulating the sending out of bulletins giving results of inspection or the execution of State laws. There is of course no obligation to send these outside the State and they might be closely restricted. Stations are not required by law to send their other bulletins to applicants outside the State, although this is largely done as a matter of courtesy and in the feeling that the benefits of station work should not be restricted to their respective localities.

In the further interest of economy, as well as of good practice, it is deemed important that critical attention be given to the bulletins themselves while they are in manuscript form. Such consideration would determine that the bulletin merited publication by the station, that it contained sufficient basis to justify it, that it was not better suited to the extension series, and if these tests were met, would see that it was not unnecessarily voluminous. It frequently occurs that bulletins might be condensed without disadvantage, though occasionally some are so condensed that most of the data are eliminated and it is not entirely clear how much of their text represents new work. There is a happy medium, and this the bulletin editor or the publication committee will be able to work out in each case.

The practice is followed by some stations, with advantage, of printing a brief abstract of a page or so, in case of large or expensive bulletins, this abstract being sent in place of the complete publication, with the statement that the latter may be had on request. In other cases, the detailed data are given at the end of the bulletin, and that part eliminated from the main edition, with considerable saving.

In order to place the results of station work effectively before the public and to keep it advised of what is being done, it is believed that more definite provision for publicity might often be made with advantage. This would serve to give the station more prominence than it sometimes enjoys at present. Means to that end are afforded by the extension publicity service now existing in practically every college, with its news bulletins, press service, plate matter, etc., through which the station publications and results could be "played up." Press notices of new publications with readable summaries might well be made a regular feature, to be sent to the leading rural papers of the State. The latter would require some special attention, and this might be provided through the editor or publication committee of the station.

The main recommendations of the committee, therefore, are along the line of critical examination of the manuscript before sending it to the printer, close attention to the mailing lists rather than abolishing them, the compromise of offering the option of prompt notices of new publications in place of the publications themselves, with the privilege of receiving the latter on application, and systematic provision for publicity regarding the station and its work through the press.

F. B. LINFIELD,  
CHAS. E. THORNE,  
E. DAVENPORT,  
CHAS. D. WOODS,  
B. W. KILGORE,  
E. W. ALLEN,

*Committee.*

The report was discussed and accepted.

P. F. Trowbridge, Director North Dakota Experiment Station, read the following paper:

#### INSTITUTIONAL COOPERATION IN RESEARCH

By P. F. TROWBRIDGE

Within a year after the passage of the Hatch Act in 1887 (March 2) Secretary of Agriculture Colman pointed out that "the stations are widely separated, they need to know more about each other's work, especially that which comes from the interchange of experience." It is noteworthy that the early efforts all led to plans for making it possible to learn what the workers at other stations had done. Lines of investigations were kept secret until the results were published. Priority was stressed, workers were jealous of each other.

The Association of Official Agricultural Chemists early led the way to cooperative work among scientists. The whole basis of the work of that association is cooperation of the chemists from the different experiment stations in the development of reliable methods of analysis.

As early as 1907 Armsby of Pennsylvania and Waters of Missouri were cooperating in animal nutrition studies. The writer was sent to State College to discuss with Dr. Armsby the details of the plans of the nutrition studies to be undertaken at Missouri. Animals and feeds were sent from Missouri to be used in the calorimetric work at Pennsylvania, so that the energy equivalent of the Missouri feeds when fed to the Missouri cattle might be accurately known.

Several stations are now cooperating with Dr. Armsby in the optimum protein studies.

At the 1911 meeting of this body it was proposed to publish a list of Adams projects. This was referred to a committee to report at the 1912 meeting. I have not been able to find a published list of Adams projects, but find that in 1912 there had been about 600 projects approved by the Office of Experiment Stations.

At the meeting of this association in 1913 the need of greater coordination between the Department of Agriculture and the States was fully discussed. A project committee was appointed which was to "function in an advisory way in the development of a plan for unity of action in project statements, and was charged with bringing together the projects of all the institutions involved and arranging for a system of exchanging projects."

The committee reported at the 1914 meeting. They sent out requests to the States for lists of projects and had received fairly complete reports from most States. About 1,300 projects of State stations were listed, and about 1,000 projects of the Department of Agriculture. I have not been able to find a published list of these projects.

The soil specialists of the northern plains stations are attempting to coordinate their experimental work by field studies of the work in progress at the different stations. These annual trips of inspection and study will surely pave the way for systematic cooperation in experiments and will lead to the avoidance of useless duplication.

The Association of Southern Agricultural Workers has done consider-

able work looking to cooperation among the station workers of the thirteen States. Standing committees on agronomy and livestock projects have been very active. Both committees have divided the States into geographical groups. The workers in each group are really sub-committees in the subject and have arranged for the sectional meetings for discussion in detail of the projects actually in progress.

The agronomy committee secured in 1917 a full list of all agronomy projects in force in the Southern States. A study of these projects shows that many stations are working upon the same projects but usually each station working without reference to what is being done by another station having similar soil and climatic conditions. Over 30 agronomic projects were found to have more or less complete duplication in two or more stations.

The Southern States agronomy committee has recommended the recognition of eight soil types or regions and the coordination of the projects in relation to these divisions. In order to facilitate the cooperation it was urged that the States Relations Service appoint a man to collect and classify all the projects. Information can thereby be available to avoid unnecessary duplication and when repetition is desirable, to permit it to be made in harmony with work already in progress. Much of the value of duplication (repetition) is lost if the conditions are not so fulfilled as to permit of the exact comparison of results.

The initiative in the coordination of the livestock work in the Southern association was taken in 1915 by the appointment of a committee to arrange for the accomplishment of this purpose if it should prove feasible.

At the 1917 meeting in New Orleans a complete list of projects in force at the stations was presented and the report of the committee concerned itself with a discussion of this list. Needless to say, many cases of useless duplication were discovered, also many cases where duplication would have given added value if the different lines of work were systematically coordinated. The committee said: "It is surprising that a body of men holding positions of such far-reaching influence had allowed their work to so depreciate in value."

At the 1918 meeting the livestock committee made a very complete report. In the attempt to coordinate the animal husbandry experimental work in the South, six main purposes were laid down by the committee in the following order of their importance:

- (1) Prevention of duplication.
- (2) Saving of funds.
- (3) Greater accuracy.
- (4) Uniform methods of experimenting for purpose of making comparisons.
- (5) Dignified and receptive results both for scientists and practical livestock men.
- (6) Cultivation of friendly relations among station workers.

This last, though fundamentally of the least importance, is absolutely necessary to the successful attainment of the other purposes.

One of the fundamental purposes of the organization of the American Society of Animal Nutrition (later Society of Animal Production) was to secure uniformity in the conduct of experiments so as to permit of the comparison of resulting data.



Our experiment station funds are especially limited in these times, but I firmly believe it would be money well spent if we saw to it that every year our scientists were given an opportunity to meet with workers in the same subjects from stations having similar problems.

We make provision for the dissemination of information already obtained at great expense. Our station workers can learn what has been done, but they are not given sufficient opportunity to learn what is being done.

The States Relations Service or a committee from this body should collect and tabulate a list of all experiment station projects now in force. This list should be revised each year, and should be available to every station worker. Subject-matter groups of workers on similar problems should be encouraged to get together and discuss their projects so that unnecessary duplicates may be dropped. Related projects should be handled so that the data secured by one station worker may be intelligible to another worker and be capable of being compared with the data obtained by other workers.

F. B. Mumford, Director Missouri Experiment Station, presented the report of the Committee on Projects and Correlation of Research as follows:

#### REPORT OF COMMITTEE ON PROJECTS AND CORRELATION OF RESEARCH

The association members of the Committee on Projects and Correlation of Research at the annual meeting of this association in Chicago, on November 12-14, 1919, recommended to the Executive Committee the organization of an Agricultural Research Council. This matter was given careful consideration by the Executive Committee and instructions issued to our committee as follows:

(1) That the Executive Committee endorse in principle the proposal for an Agricultural Research Council set forth in the report of the Joint Committee on Projects and Correlation of Research, but record their opinion that it is impracticable to carry out the proposal in full at the present time.

(2) That the Executive Committee request the Joint Committee on Projects and Correlation of Research to prepare a statement defining cooperation and correlation in research, indicating its value, limitations, methods, etc., for distribution to research workers in the stations and the United States Department of Agriculture.

That the Executive Committee request the joint committee to promote regional conferences of station workers in the interest of cooperation.

(4) That the Executive Committee urges upon the Secretary of Agriculture the early appointment of an under-secretary to guide and correlate the scientific work of the Department.

(5) That the Executive Committee request the Secretary of Agriculture to appoint a representative of the States Relations Service to the joint committee.

(6) That the Executive Committee request the Secretary of Agriculture to expedite the publication of the program of work of the experiment stations which the Office of Experiment Stations has in preparation.

(7) That the Executive Committee request the Secretary of Agriculture to have the departmental program of work made more definite as to lines of investigation so that station workers desiring further cooperation may be informed on the work in progress.

Acting upon the instructions of the Executive Committee we beg leave to submit the following report:

#### COOPERATION IN RESEARCH

Research may be carried on cooperatively by individuals, groups of individuals, or institutions. Such cooperation makes possible the divisions of labor and of financial burdens. In a general way, cooperation in research undoubtedly offers definite advantages. These may be described as follows:

(1) Cooperative effort on the part of individuals of different antecedents and working under different environments makes for the building of a broad foundation of knowledge. It helps to eliminate temporary and local factors in the interpretation of research data. It tends to narrow the range of experimental error and shortens the period of experimental study.

(2) In cooperative research enterprises special tasks can be selected by those who are best fitted to undertake them. Such enterprises help also to conserve the funds set aside for research.

(3) To the extent that cooperative research enterprises accomplish better needed facilities and insure to the participating workers better opportunity for thorough, accurate work and just credit therefor, they improve the esprit de corps among the workers.

(4) They hasten more ready recognition of the dignity of research as well as of the responsibilities of those engaged in research. Through such intelligent recognition public support is secured for the experimental study of important problems. To become truly effective, cooperation in research must be provided with a suitable organization and machinery. Since the Executive Committee has approved the principle of an Agricultural Research Council but has rendered the opinion that it is at present impracticable to promote an Agricultural Research Council, this committee offers its services in assisting research workers in the accomplishment of cooperation in research and the correlation and coordination of research projects.

The committee would be helpful in—

(a) Suggesting and outlining broad research problems amenable to study through cooperative effort.

(b) Suggesting individuals or groups of individuals to study specific problems.

(c) Working out some plan of helpful consultation by men of known experience and capacity in research.

(d) Suggesting and recommending the best method of publication of research data in scientific journals or possibly a special cooperative series of cooperative publications.

#### UNDERSECRETARY OF AGRICULTURE IN CHARGE OF RESEARCH

The Committee on Projects and Correlation of Research in consultation with the Executive Committee of the association, discussed the question of bringing to the attention of the Secretary of Agriculture, the great importance of appointing an undersecretary of agriculture whose chief function shall be the coordination and correlation of all scientific

research in the United States Department of Agriculture. Such an official could not only perform a great service for the Department of Agriculture, but could eventually, in cooperation with the officers of this association, greatly promote the correlation of all research in agriculture and nationwide cooperation between the agencies represented by the Association of Land-Grant Colleges.

#### PROGRAM OF WORK OF EXPERIMENT STATIONS

One of the chief causes of duplication of research projects is the comparative isolation of investigators and their lack of intimate knowledge as to the investigative projects of other institutions. It is the opinion of your committee that a wider diffusion of information regarding the investigative projects in progress at each station, would be of the very greatest interest and value to all investigators and would form the basis for an effort to bring about some sort of correlation and coordination in the principal lines of investigation.

It would, for example, be greatly to the advantage of every investigator in animal nutrition if he had a knowledge of similar work being done in every other station and if he could within certain limits coordinate his investigations with those of other leaders in this field. A publication placing on record the chief investigative projects of the experiment stations accompanied by data which would give investigators in the same line the basis for an intelligent opinion, would be most useful and acceptable. The Office of Experiment Stations of the United States Department of Agriculture, has in preparation a complete list of investigative projects now active in the State experiment stations. It is the opinion of this committee that the prompt publication of this program of work will be of very great service in avoiding duplication and encouraging correlation and cooperation in research between the stations. We urge upon the Secretary of Agriculture, the earliest possible publication of this record of research projects in order that the information may be available for the use of investigators.

#### PROGRAM OF WORK OF THE UNITED STATES DEPARTMENT OF AGRICULTURE

The program of work of the United States Department of Agriculture, now available to all station investigators, is a useful and valuable publication. In its present form, however, it does not furnish sufficient information regarding the actual character of the investigations to be useful as a basis for bringing about a more satisfactory correlation and coordination of research projects either in the Department of Agriculture or between the Department of Agriculture and the experiment stations. It is the judgment of this committee that the publication would be of very much greater service if it could be made much more specific and definite. If the publication really gave information as to the actual method of attacking a problem and some idea as to the real character and significance of the investigation it might become, in connection with the program of work of the State experiment stations, the most important source of information available for actually undertaking the work of better cooperation in research and a more satisfactory correlation and coordination of investigative projects.

## REGIONAL OR GROUP CONFERENCES TO PROMOTE COOPERATION IN RESEARCH

The Executive Committee of the association, after considering the last report of the Joint Committee on Projects and Correlation of Research, requested this committee to take steps to promote regional conferences of station workers in the interest of cooperation. The advantages of such conferences to bring about a more complete understanding of the research projects under way in specific fields in the institutions, to accomplish the reduction or elimination of unprofitable duplication, to standardize methods to the extent necessary to make results reasonably comparable to promote agreement on terminology, to round out investigations more completely, and to aid in the effective planning of the work, become apparent on thoughtful consideration of what the proposal contemplates. The joint committee heartily endorses the proposal of the Executive Committee.

Two types of conferences may be considered: (1) In a limited way, there may need to be what may frankly be designated as regional conferences, to discuss the common problems of the region that are or should be subjects of investigation at a number of stations within a given area. The regional area would need to be elastic, as it would vary with the questions to be considered. There would seem to be no merit in endeavoring to divide the country into fixed sections to bring about conference of the station workers within the several sections, except, perhaps, for occasional stock-taking purposes. Conferences of this type would be largely administrative. (2) It is highly probable that what we may designate as topical conferences, called to discuss particular projects or specific undertakings, will serve a large need. These would sometimes be regional and sometimes national, depending on the character of the project or discussion. And they would be composed of research specialists at work on the specific problems to be discussed.

Two means of promoting such a conference suggest themselves: (1) They be arranged through the national professional societies now working in the several fields; (2) they be independent, special conferences arranged by the interested workers or by the joint committee of this association.

The importance of utilizing and strengthening the existing professional societies should not be overlooked. Here we already have machinery for assembling the workers in many special fields. Some of these societies already have project committees. Specific undertakings at the stations are occasionally considered. Encouraging these societies to make special provision for conferences of workers are specific undertakings, and encouraging stations to provide more freely for the payment of expenses of workers to attend the meetings of the societies for the purpose of such conferences in addition to the other advantages of the gatherings, are considerations worthy of our attention. These societies might profitably arrange their programs so that special topics in research would be presented by prepared speakers—something in the nature of symposium, for example. These could be analytical and critical and would help to establish the actual status and to call attention to steps which need to be taken. These voluntary societies may exhibit more vitality and spontaneity than formally arranged conferences. They should be fostered, and care taken not to weaken them by drawing away workers for special conferences. A day set aside in each annual program for conferences on station projects,

meeting in any number of groups that may be called for, could be made highly profitable. If the association approves, this joint committee might be instructed to present the matter to the officers of the proper professional societies.

Whatever may be accomplished through existing societies, there would seem, however, to be need for special conference arranged independently by station workers. Many of the discussions here contemplated are likely to be so specific and restricted as to interest only a small number of workers—perhaps 4 or 5 up to 20 or 30—and not to be sufficiently broad to comprehend the interest of the entire membership of any of the societies. They are likely to call for only occasional discussion, not annual. They would aim to bring to bear upon certain definite and usually narrow subjects of investigation the combined judgment and suggestion of the best experts engaged in the respective fields. This would relate to the manner of approach, the methods of investigation which are being followed, the general status of the subject, the conclusiveness of the results, the defects they may embody, and means for advancing the study of the problem more systematically and surely, by cooperation or otherwise. Such conferences would often require quite a little time and close application. Mere superficial consideration would not be very profitable. Persons are too prone to get together and talk things over in a general way, and our agricultural workers are no exception. The joint committee does not wish to encourage this. It has in view conferences which look toward real constructive work. In many instances a single conference of interested workers will suffice to clear the situation and effect whatever cooperation may be needed. The advantage of quiet discussion, apart from the disturbances and distractions which invariably attend the meetings of societies, needs only to be mentioned.

The machinery for arranging such conferences should be simple. The most direct means would seem to be for two or three interested workers to associate themselves in inviting their colleagues in other institutions to meet with them at a given time and place for the discussion of a specific undertaking. In addition, acting on the request of the Executive Committee of the association, this joint committee offers its services in helping to arrange conferences on the request to its chairman of any station workers or workers desiring it to take the initiative in forwarding arrangements. Furthermore, the association may desire to authorize the joint committee to review projects under way, so far as this may be found feasible, and to select lines of inquiry on which conference would seem to be desirable and to take the initiative in inviting specialists to such meetings, after due consideration of the proposals by the administrative officers of the stations concerned.

It is expected that these conferences will begin in a small way, and will be no more frequent than the work necessitates. Many projects do not call for such conference and involve no need for cooperation; they will be better carried alone by the individual worker. Nor is it contemplated that many conferences should be arranged at once. They will grow naturally out of the work as it develops. The limitations of time and expense are clearly recognized. In every case, the scope and range of the conference would be determined by the nature of the problem. The conferences should be informal in order to develop free discussion and to

encourage interest in partnership work. Round-table discussions are likely to be most productive of common plans and agreements. It need scarcely be said that such conferences must be voluntary, free from any suggestion of enforced cooperation.

The cause of cooperation in research will be very materially advanced if the stations will publish lists of investigations in progress, under titles or explanations sufficiently definite to indicate the particular phase of a problem, on which work is being done.

To sum up: It is the opinion of your committee that the work of our stations can be greatly aided by conferences of workers to promote understandings and cooperation on specific undertakings which may be objects of study at several stations. The committee recommends that every possible means be employed to establish in the minds of workers the importance of conference and cooperation on undertakings of interest to workers in several stations. It recommends, further, that this association record its conviction that provision to pay traveling expenses of workers to attend such conferences as may from time to time be arranged is as essential to the economical and efficient discharge of the station's obligations as provision for equipment or facilities for the conduct of research. Finally, the committee invites station workers to utilize its services in arranging for group, topical, or regional conferences when no other more ready means is available.

We recommend that this committee be authorized to confer with the National Research Council with a view to determining whether a more definite cooperation between this association and the National Research Council is practicable and desirable.

F. B. MUMFORD,

J. G. LIPMAN,

A. R. MANN,

*Committee.*

In the general discussion of the report considerable attention was given to regional conferences. It was moved and carried that the report be received and that the recommendations concerning regional conferences between workers and the provision for conference with the National Research Council be adopted and transmitted to the general session.

#### ELECTION OF OFFICERS

The following officers for next year were elected: President, F. S. Harris, Director Utah Experiment Station; secretary, T. P. Cooper, Director Kentucky Experiment Station.

Adjourned.

## SECTION OF AGRICULTURE—EXTENSION WORK

WEDNESDAY MORNING, OCTOBER 20, 1920

The session opened with the following paper by R. K. Bliss, Director Iowa Extension Service:

### RELATION OF EXTENSION WORK TO THE NEW FARM BUREAU MOVEMENT

By R. K. BLISS

I assume that the "New Farm Bureau Movement" refers to the federation of county farm bureaus into State and National organizations. I shall not, therefore, discuss the relationship of extension work to the county farm bureaus, further than to recall to your attention the fact that the great majority of county farm bureaus in the United States owe their existence principally to the encouragement and support of agricultural colleges and the United States Department of Agriculture. The county farm bureau is the outgrowth of the study and effort of State and Federal extension officials, cooperating with prominent farmers, with the object in view of bringing about a closer relationship between agricultural colleges and rural communities.

The federating together of the county farm bureaus of a State into a State organization with duly elected officers and an employed secretary and other paid workers as may be needed, naturally brings up new problems of relationships between such an organization and the extension service of the State. If any extension service is puzzled, as regards what such a relationship should be, my suggestion is to first get clearly in mind the object of Federal and State lawmakers in appropriating funds for extension work. As I understand it, the underlying reason for such appropriations is a national one and based on the proposition that the future economic prosperity and political security of the nation depends primarily upon agriculture and the people living on the farms. The ultimate end in view, therefore, is to develop a rural population in the United States which is capable of farming in such a way as to get maximum food production, when it is needed, without depleting the nation's greatest natural resource—soil fertility. To carry out successfully such a program, it is necessary to develop the highest type of intelligence and leadership on the farms of America.

This, as I understand it, is the end in view. The means by which that end is achieved is relatively unimportant. It is of little consequence whether it is accomplished through extension work or in some other way, the important thing is to get results. The extension services of the various States are vital factors in this movement, so also are the State federations of farm bureaus. There should, therefore, be the closest possible relationship and cooperation between the extension service and the State farm bureau federation. Both are, or should be, working for the same result, even though they may be going about it in different ways.

As long as the State federation of farm bureaus confined its activities to educational work, provided for under the Federal Smith-Lever Act and State laws, the relationship of extension work to it was comparatively simple, but now that the farm bureau movement is entering fields of activity not provided for under State and Federal laws, the relationship is somewhat more complicated, but easily adjusted if certain fundamentals are adhered to. One very important thing is to see to it that Smith-Lever funds, State funds and offset funds are properly expended under the law. Such funds are for educational work along agricultural and home economics lines and they should be scrupulously so used. By so doing all complications as regards the use of funds will be avoided. Fortunately Federal and State legislatures have made the laws very liberal as regards educational work that can be done.

In Iowa the closest possible relationship is maintained with the State Federation. The director of agricultural extension and the State leader of county agents are members of the State executive committee of the State federation and are expected to be present at all meetings, but do not have the right to vote.

In addition to executive meetings conferences are held between members of the agricultural extension department and committees of the State federation. The director of agricultural extension keeps in close touch with the president and secretary of the State federation. We find the State federation a great asset to us in our educational work. Much better results are being accomplished educationally than could otherwise have been accomplished had it not been for the cordial support of the federation. We invite the officials of the State federation to confer with us in working out educational plans, and the results so far have been gratifying indeed. I am convinced that our educational programs, both county and State, are better prepared and I am sure that they are carried out more effectively because of the sound advice and active support which we have received from Federal officials.

A State federation of farm bureaus is certain to do things which an extension department cannot do. But this fact need not in any way lessen the close relationship which should be cultivated with the State organization. One year ago in a thorough and comprehensive paper presented before the annual meeting in Chicago, the Iowa definition of a State farm bureau federation was given not because of its excellence, but because it differed from any other definition given by the Northern and Western States. The Iowa definition was as follows:

"A State farm bureau federation is an association of several or all of the county farm bureaus of the State, which is officered and financed entirely by farmers for the purpose, first of collectively seeking a solution of problems of a State-wide or National nature, such as transportation, marketing, legislation, etc., which the individual farm bureau cannot, because of its size and the source of its funds, undertake, and second, to assist the county farm bureaus in their various educational projects which are being carried on in cooperation with the State agricultural college and the United States Department of Agriculture."

After an additional year of experience, I see no reason to change the foregoing definition. The Iowa farm bureau federation during the year circulated petitions to defeat the Day Light Saving Law and Nolan Land



Tax Bill. Its representatives made several trips to Washington to confer with congressional committees on matters of legislation, pertaining to transportation, marketing, rural finance, etc. An agreement was made with the State Veterinary Association whereby hog cholera serum used by veterinarians in their practice will be sold at a fair price. A State-wide farm bureau membership campaign was carried out. Strong agricultural planks were incorporated in the platforms of both the Republican and Democratic State tickets. A competent lawyer has been retained to look after the farmers' interests in the recodification of the State laws which was authorized by the last legislature. In cooperation with other organizations, a trouble man is being maintained at the Chicago Stock Yards. The foregoing are some of the more important things which have been done in Iowa by the State federation, all of them very helpful to the agricultural interests of the State and most of them activities which the agricultural extension department or the college cannot undertake.

Some have expressed to me a fear of overlapping and consequent friction on the part of the State federation and agricultural extension activities. We have had no difficulty along that line in Iowa. Our relationship has been most cordial and the line of demarcation between the two grows clearer the longer we work together. If any State is having trouble along that line, I suggest as a remedy more conferences between federation and extension officials in order that each may have a clear and full understanding of what the other is trying to do.

It is a simple matter to convince the leaders of our country that agriculture is the foundation of the Nation's strength; that soil fertility is our greatest national resource and that the future ability of the Nation to comfortably feed and clothe a great population, will depend primarily upon the soil and the way in which it is cultivated. It is not, however, a simple matter to get all to see that apparently the only possible way in which this can be accomplished is through cooperation and organization on the part of the farmers along economic and social lines, combined with State and Federal assistance along educational lines. Moreover, the farmers themselves have yet to learn the vital need of cooperation and organization. The greatest danger to farmers' organizations in the past has come from the farmers themselves, from the inside and not from the outside. The State and National farm bureau federations are making a special effort to acquaint city people with actual facts concerning the agricultural situation and at the same time to educate all farmers and farmers' organizations to the imperative need of pulling together. It is a mammoth task, but one which must be carried through if agriculture is to take its proper place in our national life and perform its largest service to the Nation. Extension divisions should consider it both a great privilege and an unprecedented opportunity to give every possible assistance in this great work.

In summing up, may I not say that organization and cooperation among farmers offer the best and most effective way of developing the agricultural resources of the United States. And if, as our leaders tell us, the future greatness and security of our country are inseparably linked with our ability to feed ourselves, should we not, as extension workers, maintain the closest possible relationship and give every assistance to the

new farm bureau movement, which gives every indication of accomplishing a great service to American agriculture?

T. R. Bryant, Assistant Director Kentucky Extension Service, read the following paper:

#### SHOULD EXTENSION WORKERS AID IN ORGANIZATION OF FARM BUREAUS?

BY T. R. BRYANT

It is probable that long before we began generally to call farm bureaus by their present name, we really had them organized, in the majority of the States, but we knew them by such names as, Crop Improvement Association, Better Farming League, Farm Improvement Club, County Farm Association, etc. Early in the history of agricultural extension activities, the workers became aware of the fact that it was impossible for them to reach all farmers individually, and in consequence came to understand that a good county agent would very soon have his county organized into community clubs or something analogous thereto, these clubs having representatives on a central advisory board.

The activities of these clubs and federations of clubs soon came to embrace a wide range of undertakings. The majority of them at the outset, being of a distinctly educational nature, were under the direct supervision and guidance of the county agents. In the course of time these clubs became well enough developed and the local leadership became such as to enable them to carry on their business without the constant supervision of the county agent. We have all heard county agents tell with satisfaction and pride of certain clubs in their counties which could hold meetings and conduct business as well without the county agent as with him. Naturally this was regarded as indicating a highly developed organization. For a time, even after aggressive local leadership had developed, the clubs confined themselves more or less closely to matters distinctly educational, but in the course of time, realizing the strength brought by organization and the power to cooperate, these clubs began to undertake many activities in which the county agent, owing to the nature of his official position, could act only in an advisory capacity. It is immaterial for us to attempt to determine at what stage of development the idea of paying dues became injected, but along with this development came the movement toward more perfect federation into county organizations, the county into State federations, and the States into one of national or international scope. It is natural that in this movement toward federation, State and national officers should be chosen, many of them being paid good salaries.

Some of the State federations very early created machinery for organization work in those counties not already organized, and for furthering their purposes through augmented membership in those counties already organized. In the course of these undertakings, it was quite natural that when a county with a group of well organized community clubs was entered, and the effort was made to annex these community clubs already in existence, the effort was usually more or less successful. This method of procedure was not anything new, as we had already seen membership campaigners from other organizations of farmers enlist the membership of our community clubs almost in a body.

Thus we find ourselves confronted with several questions, such as the following: Is the usefulness of the community club increased or is it lessened when the club becomes part of a larger organization with a wider scope of activities? Does the club, in the course of this metamorphosis, become a more efficient instrument in the hand of the county agent for extending his teachings and demonstrations, or does it become less efficient? Is there likelihood that when community clubs become part of a State federation they may lose their value to so great an extent that the county agent would feel that his work in organizing them had been in vain? Do the activities of these clubs often diverge so widely from the work contemplated in the Smith-Lever Act that the county agent can cooperate effectively with them in only a very few activities?

Upon the nature of the answers that may be given to these and other similar questions would depend the nature of the answer to the question, Should the county agent and other extension workers attempt to organize county farm bureaus? It would seem possible that there may be two conceptions of what farm bureaus actually are. Extension workers might understand the term to mean a very different kind of organization from that in the mind of some of the members, or at least in the mind of paid organizers. In other words, the college understands the farm bureau to be a group organized for educational purposes and for community betterment. Others may understand it to be a group organized for educational purposes, community betterment, commercial endeavor, and even for speculation. Even if the latter definition must be accepted, county agents would not yet find it necessary to stand entirely aloof.

County agents may work to advantage with the farm bureau, the Farmers' Union, the Grange, the Society of Equity, boards of trade, and many other organizations which provide effective machinery for furthering the work which the county agent wishes to undertake, but it would seem entirely outside the province of the county agent to set about deliberately to organize farmers' unions, granges, societies of equity, boards of trade, etc., simply because such organizations when once created will be helpful to him in his work, in so far as a similar percentage of their activities are concerned. The question arises: Can we segregate the farm bureau from this group of organization, and if so, how can we justify ourselves in so doing? In order thus to justify ourselves in making a favorite of this particular organization we must show that it lends itself more readily to the accomplishment of the purposes for which extension work was created, and before extension workers—salaried public servants—could legitimately address themselves to the task of organizing farm bureaus from top to bottom, and setting them in motion, we should be certain that this organization is created distinctly for the purpose of furthering such enterprises as are contemplated under the law. If, perchance, experience should teach us that farm bureaus thus organized have a regular habit of wandering away, once they have learned to walk alone, into unbidden paths we should at least learn from this experience not to repeat the performance, at least that we should not repeat it in exactly the same way. One thing which becomes apparent in this connection is that the organization of the farm bureau may embrace two or more phases, first the preliminary work, including instruction as to the purposes of organization, the power

to be derived therefrom, the results that may be accomplished in the way of education, community betterment, etc. The last phase of organization is the personal solicitation of memberships and the collection of dues. If we take it for granted that the farm bureau is not going to confine itself to the activities in which the county agent can legitimately play a direct part, it would appear that in the earlier phases of development mentioned above, the county agent and other extension workers might legitimately play an active part, but in the later stages they would certainly have to leave the work to other hands. Experience seems to teach us that discreet extension workers have little difficulty in showing these points clearly to intelligent farmers, even if federation officers should, in occasional instances, attempt to strengthen their organization by making too great use of the forces provided by the extension service. It is evidently not contemplated by those in charge of the national federation and of the leading State federations that governmental agencies should constitute their organization force, this being indicated by the fact that they have provided rather liberally for their organization work and for membership solicitation.

It can readily be seen that the farm bureau which eventually engages in a large variety of activities, including those in which the county agent cannot directly engage, may be regarded as a sort of evolution of the farm bureau, as extension workers originally understood the term. It does not necessarily follow that because of this shifting the county agent must withdraw his help, but it would mean that the county agent must keep himself out of a position where he and his work can be hurt by the failure of any of the precarious enterprises which farm bureaus, having shifted from their original purposes, might undertake.

Direct organization involves a statement of purposes and ends to be sought and expected, concluding with the enrollment of members and the collection of dues, whereupon those paying dues expect the results promised and they often expect them to arrive in an unreasonably short time. Experience is indicating that many of the things being undertaken by farm bureaus can scarcely be expected to succeed, whereupon someone must accept responsibility. These facts apply at all times, but it is especially important at the present time that we keep this truth clearly before us, because the period of reconstruction is bringing about circumstances not likely to be favorable to the undertakings frequently attempted by farm bureaus in their commercial endeavors. The fact that the present state of reconstruction is one of declining prices serves to make the punishment for unwarranted adventure more quick and sure. This punishment will be visited not only upon the indiscreet extension worker but also upon the newly elected organizer of farm bureaus, who, desiring to intrench himself and show immediate results, is likely to attempt foolhardy things in his efforts to redress alleged grievances and correct abuses which he may have referred to while organizing his bureau.

The following paper was presented by M. S. McDowell, Director Pennsylvania Extension Service:

SHOULD EXTENSION WORK HAVE A WORKING AGREEMENT, (a) WITH THE  
COUNTY AGENT, (b) WITH THE COUNTY FARM BUREAU OR  
OTHER COUNTY FARMERS' ORGANIZATION?

By M. S. McDowell

We shall not attempt to answer these questions categorically. We take it that under present circumstances various answers would have to be given if all the conditions found throughout the country should be met. We believe, however, that there are fundamental principles which may well guide in determining what the answers to the questions should be and in establishing the relations which various parties in the work should bear to each other.

The first one as to whether extension work should have a working agreement with the county agent might be given a Yankee answer; that is, by asking other questions.

Should the board of trustees of an institution have a working agreement with the president other than the usual and proper understanding concerning the duties and responsibilities of the position?

Should extension work have an agreement with specialists?

Is the county agent a part of the extension system or is he something else?

The extension idea grew out of the need for a means to put to practical and general use the information which had been accumulated by the experiment stations and to disseminate good farm practice followed by good farmers. The Smith-Lever Act, providing funds to the land-grant colleges for extension work in agriculture and home economics, passed by Congress in 1914, which is the foundation upon which we now stand, was meant to furnish a channel through which helpful information and assistance could be given. Section 2 of this Act defines what shall constitute extension work:

"It shall consist of the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or residing in said colleges in the several communities, and imparting to such persons information on said subject through field demonstrations, publications and otherwise."

Obviously, therefore, extension work within the State is for the dissemination of information and must be educational in character.

This legislation was not made in the interest of the farmers alone but because its results would be helpful, directly or indirectly, to the whole people. There can be no justification for the expenditure of public funds, Federal, State, or county, if such expenditure is not in some way in the interest of all of the people.

The necessity for proper organization in order to secure results is recognized by everyone. The extension service cannot perform its mission without proper organization and coordination. We wonder if in the past too much stress has not been placed upon type of organization and the part played by certain parts of the organization and too little attention given to the purpose which extension work is supposed to fulfill. After all subject matter is the foundation upon which the whole structure must be built both as applied to production and distribution and the extension organization should be built accordingly. In dairying, in horticulture, in

animal husbandry, in plant disease and insect control, in farm management, in marketing and distribution there are principles which, correctly applied, make for a better and more prosperous agriculture.

If the extension organization is to serve its purpose and best serve agriculture along the lines intended by the Smith-Lever Act it must be organized with a clear understanding of what is to be done.

The essentiality of subject-matter specialists in extension work is to serve in an effective way is of course not a part of this discussion but needs to be emphasized in this connection since the accomplishment of results requires proper direction and coordination of all efforts put forth for improvement. This cannot be accomplished if there is not a definite relationship between all parts of the extension organization. To be effective machinery must function properly.

The county agent and specialist are vital to each other. They must be parts of one extension organization if their efforts are to be coordinated and made effective. They must function together and not separately. This cannot be accomplished unless all work is directed through one extension office.

The United States Department of Agriculture and the agricultural colleges are official agencies in the nation and within the States upon which rests the responsibility for the expenditure of public funds. We believe it was the intent of Congress that these public agencies should guide and direct the efforts of those receiving any part of these funds as compensation. Certainly if things go radically wrong there is no question where the blame would be placed. Can the United States Department of Agriculture and the colleges carry this responsibility if the county agent does not regard himself as a part of the extension organization in the same way as the specialist does? If the county agent is a real part of the extension system no memorandum of understanding with him is necessary any more than would be the case with any other extension employee. This does not mean that the local people have no control over what is done.

The necessity for local organization, in order to develop a definite program, is obvious. The county farm bureau is the organization which serves as the local point of contact. It is essential that the people of a county or a community take upon themselves certain responsibilities in determining the particular lines of work to be undertaken and in executing that work. In the last analysis, accomplishment will depend upon what the people themselves do rather than upon the extension service itself. All extension work in a county should be done through the farm bureau organization. The people of a county or community know their own problems and should not only determine the lines of work to be developed but should assume an active part in the development.

You are all familiar with the community plan of organization. The following represents an outline of what we know was worked out in one county. Committee meetings were called by the county agent in each community. The committees consisted of from six to eight progressive farmers representing the different lines of agriculture in each community. With each committee was worked out a program for that community and leaders were appointed to carry out the plans for different lines of work. It was through these local leaders that the extension work was conducted in each community. Because of the responsibility placed upon them by their own

people the local leaders took a keen interest in the work and the result was that by the end of the year a very constructive program was carried out and a large number of individuals were reached. The combining of the community programs made up the county program. When the community programs were brought together it was found that all of the ten communities wanted poultry improvement work and eight of them wanted work in potato improvement, particularly in the control of potato diseases. This meant that the poultry specialist and the plant pathologist followed these lines of work very carefully in those communities.

A definite and systematic program of work in each community and county developed by the extension service and the farm bureau working together is necessary. The county agent is the local representative of the extension service and when the general plan has been mutually agreed upon the extension program of the farm bureau, of the county agent and of the specialist—the latter two constituting the extension service—should be the same program.

In many instances there is a tendency to regard so-called county agent work as one thing and the work of the specialist as a separate and different thing. We do not believe that an understanding with the county agent in the county will eliminate this difficulty. Furthermore we believe that with proper organization no special memorandum is necessary other than the usual understanding regarding the conditions of employment. We believe the whole extension situation could be greatly improved through the elimination of terms heretofore in common use and from their very nature capable of very general misinterpretation and misunderstanding. We would suggest that the title county agent leader, State leader of county agents or whatever similar name has been used in past be scrapped and that the individual looking after this work be given a title which will specifically connect him with the extension service under the director's office. In our own case we do not recognize any county agent leader. The man or men who are responsible for this work are assistant directors of extension and are regarded as such both by the specialists and the county agents.

The fact that a county agent is an employee of the United States Department of Agriculture receiving some part of his compensation from that source might tend to divert attention from the extension organization of the State of which it is a part. However, proper understanding with the States Relations Service regarding the status of such employees should obviate any such difficulties.

The form of the reports which the county agents are asked to make certainly tends to develop and extend the idea that no work is done except by the county agent, when as a matter of fact without the backing and help of the specialist the county agent frequently would not be able to accomplish results in a large way. We feel that these reports might well be made up in such a manner as to make them reports of extension work without making it appear that the county agent was the only individual responsible for accomplishments.

We believe some such arrangement as was suggested for the elimination of the title "County Agent Leader" within the State might also be well applied to reorganization of the extension office of the United States Department of Agriculture. Would not a better understanding be brought

about and working conditions be improved by handling all extension work of the Department of Agriculture through one extension office instead of splitting it up into groups as at present? With reference to the understanding with the farm bureau itself we believe the same principles apply.

If there is proper conception of what the extension service is and what its mission and functions are no written memorandum may be necessary. If there is not such understanding a memorandum may well be made to avoid future misunderstanding.

WEDNESDAY AFTERNOON, OCTOBER 20, 1920

The report of the Committee on Extension Organization and Policy, presented at this session, was as follows:

#### REPORT OF COMMITTEE ON EXTENSION ORGANIZATION AND POLICY

Your committee on organization and policy in considering the extension problems has taken the following steps.

The chairman of the committee at the request of the States Relations Service and upon authorization of the Executive Committee conferred with the States Relations Service, May 20 and 21, regarding matters to come before this committee as a whole. This conference resulted in the following questionnaire being sent to all extension directors.

NEW BRUNSWICK, N. J., August 13, 1920.

To Extension Directors:

The Committee on Extension Organization and Policy of the Association of Land-Grant Colleges is giving consideration to some matters which are believed to have very vital relations to the development of extension work, and it is our desire to report on some of these matters at the annual convention of the association at Springfield next October. The extension organization met the problems of war and made good. The problems of peace are likely to be more difficult of solution than those of war. We now lack that stimulus which came with the war when people were ready to take many things on faith that they would "help win the war." Now is the time when everything is being tried in the balance and extension work must prove itself as a peace measure. Emergency funds have been discontinued and all appropriating bodies are considering every possible means of retrenchment. Our extension organization must be able to meet every criticism, and by its work show that as a reconstruction and peace measure, it is worthy of liberal financial support.

That your committee may be advised of conditions in the various States and be able to prepare our report based upon actual conditions, we are submitting to the extension director of each State a number of questions, the complete answers to which will greatly assist us in our report. Your consideration and answers to the questions which follow will be appreciated.

(1) The Smith-Lever funds as provided for in the Act of Congress of May 8, 1914, have now practically reached their maximum, and yet the county agent system which it was expected would be established in every county as the result of these funds is in many States far from being complete. Should this be true in your State, what are your plans for the further development of the county agent work? Must you depend upon additional appropriations from Congress, or will you look to the State Legislature, or to the counties themselves for the necessary funds to complete the county agent system?

(2) The employment of home demonstration agents and of county club agents has been a development which was almost unthought of during the discussions of Congress regarding the Smith-Lever Act. At the present



time these two lines of work in some States parallel the development of the county agent work. This is making a demand for funds never anticipated in the Act of Congress of May 8, 1914. What are your plans for financing these lines of work in your State? Do you contemplate ultimately a county agent, a home demonstration agent and a county club agent in every agricultural county of your State? What are your plans for financing the work?

(3) Another development apparently not contemplated by Congress in considering the Act of May 8, 1914, has been in the employment of subject-matter specialists in extension work. Almost without exception in the Northern and Western States, extension specialists are being employed in considerable numbers. This is making large demands upon the Smith-Lever funds, and possibly in some States is checking the development of the county agent work. Do you consider extension specialists in subject matter necessary in your State for extension work? In your distribution of funds for the various lines of work, have you set aside any definite percentage for the employment of specialists and for the employment of agents in the counties? If so, what is your basis of distribution?

(4) If you are employing subject-matter specialists in extension work, is this work being so tied up with the program of work in the counties as being developed by the county agents that it is all really one piece of work, or do your subject-matter specialists carry out instructions and demonstrations not closely tied up with the work of your county agents?

(5) If you followed the discussions of Congress at the last session, you saw that the employment of extension specialists received some severe criticism. If we are to continue the employment of specialists, and to receive adequate support from Congress in extension work, it seems necessary that we develop some system by which the work of the specialist may be better known that it has been. Have you developed any plans looking towards this end? What suggestions have you as to ways by which we can more effectively get before the committee of Congress information regarding the necessity for the employment of subject-matter specialists?

(6) During the past year the States Relations Service made request for copies of the original reports of specialists to the extension director. Does the furnishing of this report to the States Relations Service seem to you one means by which we may insure more adequate information being given to Congress regarding the work of the specialist? Was there any objection on the part of your State in furnishing copies of the original reports of the specialists to the States Relations Service?

(7) Recently and for the first time, the States Relations Service requested that in addition to the regular projects which are filed, that there be submitted a detailed program of work as proposed for each specialist for the present year. Was this request by the States Relations Service one likely to make for closer cooperation between the Department of Agriculture and the States, and likely to result in the States Relations Service being able to represent us more adequately before Congress?

(8) During the war Congress provided funds so that a large number of subject-matter specialists were employed by the various bureaus at Washington. Recently the most of these have been discontinued. In your opinion, what should be our policy towards the employment of subject-matter specialists by the various bureaus of the Department of Agriculture? Would you favor subject-matter specialists being cooperatively employed with the States with headquarters in the States, or specialists who might travel out from Washington from time to time giving assistance to extension workers employed wholly by the State?

(9) Would you think it wise for our committee to unite with the States Relations Service in requesting a liberal appropriation by Congress for the employment of subject-matter specialists in extension work to represent the various bureaus of the Department of Agriculture who would have their headquarters at Washington?

(10) What type of specialist employed by the United States Department of Agriculture have you found of most service to your State?

(11) What is your attitude toward the employment by the States of

part-time specialists in extension work, namely workers who may devote a part of the time to resident instruction, part time to research work, and part time to extension? Is this a system to which we should give encouragement, or should we endeavor to bring about a policy which would result in the employment only of full-time specialists in extension work?

(12) We recognize that probably in every State the president or dean of the college and the head of the subject-matter departments in teaching and experiment station work are called upon for information and assistance in connection with extension work. The extension projects usually state that the head of the subject-matter department shall be responsible for the subject matter taught. In your opinion, and in your State, should the head of the subject-matter department receive a part of his salary from extension funds because of this service rendered to extension work?

(13) The financial report for extension work is for the year ending June 30, but we have been requested to make the subject-matter reports cover the crop season. These subject-matter reports then are due each year about the first of December. In some States the forwarding of this subject-matter report to the States Relations Service has been delayed until it has been printed for distribution within the State. This has resulted in some embarrassment to the States Relations Service because of the delayed information. Do you find it possible and desirable for your State to submit a manuscript copy of the subject-matter report due about December 1, prior to its being printed within the State, thus avoiding the delay which usually results in State printing?

At our last annual convention in Chicago, it was agreed that an amount not exceeding \$500 each year might be properly expended by extension workers for travel outside of the home State, it being understood, of course, that these expenditures would be for work under approved projects and subject to the approval of the States Relations Service, the same as all others. Have you found it necessary to incur travel in excess of \$500 outside of your home State? Should we consider increasing this amount available for outside travel, or is the present amount satisfactory to you?

(14) During the past year in your relation with the United States Department of Agriculture have there been any matters to which you would wish consideration given by the Committee on Extension Organization and Policy? If so, kindly furnish me with detailed information so that I may lay the matter before our committee.

I think we have all come to see very clearly that in the development of our extension work within the State, it is really all one piece of work, and that the success or failure of the work in one county has very direct effect upon the work in every county. It seems to me in our national organization of extension work, the same principle holds true. Should there be any development in one State which discredits extension work, we would in every State be influenced by the results.

I ask, therefore, that in furnishing for the committee information along the lines suggested by my questions, you will feel that we are one national organization bound together very closely and that all States are directly concerned with the success of the work in each State.

Very truly yours,

L. A. CLINTON,  
Chairman of Committee on  
Extension Organization and Policy.

A meeting of the committee was held in Washington, September 8, to consider problems in relation to cooperative extension work. October 18 and 19 a meeting of the committee was held, at which the committee carefully reviewed the replies of the questionnaire from 43 States as the basis for this report. A review of the extension work of the several States shows the largest and most efficient service to agriculture can be rendered by the full development of (1) county agent work, (2) home demonstration

agent work, (3) boys' and girls' club work, and (4) subject-matter specialists.

Without exception every State reports inadequate funds for the full development of the program of work as above outlined. Increased funds must be secured to provide for the necessary expansion and efficient development of the work.

The increase in costs of extension work must be recognized. Salaries and overhead expenses have practically doubled during the past five years. At the present time there are 650 agricultural counties without county agents and more than 1,800 counties without home demonstration agents. This, together with the great need for the further development of boys' and girls' club work, and the work of subject-matter specialists, emphasizes the immediate and urgent need for additional appropriations.

It is found that in order to render the most effective service, agents engaged in county work need the assistance of workers qualified to give the latest and best information on the technical phases of agriculture and home economics, and bring to them the latest developments and discoveries of investigators in the United States Department of Agriculture and the State experiment station. In nearly every community farming people are confronted each year with the diversity of problems in the solution of which they demand the services of highly trained men and women who have given special attention to these problems.

The successful development of the agriculture of the various States and the nation depends upon the planning and carrying out of State, regional, and national programs. The specialist renders a most valuable service in working with the county workers and in unifying and correlating their efforts. Every State recognizes that the subject-matter specialists are absolutely necessary for the success of extension work.

In order that the work of specialists receive proper recognition, it is recommended that extension directors and the States Relations Service give consideration to the amplification and better presentation of the programs of work and reports of specialists.

Reports show that a number of States are employing part-time specialists. Such a practice is perhaps made necessary under certain forms of institutional organization or in States having inadequate funds. The opinion of extension directors is practically unanimous in favoring the employment of full-time specialists, and is hereby recommended.

In a few States, deans and heads of departments receive a part of their salary from extension funds. In the opinion of the committee this practice is not to be recommended. Should the head of a department devote his entire time for a reasonable period to extension work in the field on an approved project, under the supervision of the director of extension, to whom he will render proper reports, then extension funds may be used for payment of the salary of the worker for the time thus engaged. This should be considered as a temporary expedient rather than as a permanent fixed policy.

Extension work should provide for all year round program. This makes it necessary that specialists and county workers with the local people shall agree upon the local problems and upon the methods by which these problems may best be solved. Your committee commends the policy inaugurated by the States Relations Service of requesting the

seasonal program of work of the specialists and urges that the directors of extension cooperate to the fullest extent in the larger development of this policy. Such a procedure will serve us as a basis for reports which will more adequately present the work of a specialist.

Under the Smith-Lever Act, all financial reports covering the work under this Act are to be made for the fiscal year ending June 30. The States Relations Service through the Secretary of Agriculture is required to furnish Congress timely information covering extension work carried on in the several States. In order that this may be timely and available, immediately after the assembling of Congress, it is necessary that the annual narrative reports of directors of extension include the latest available results and be submitted on or before December 1. Since the final tabulations and report cannot be made until all reports are in, much embarrassment and confusion result from their delay. In the interest of all extension work, the necessity of submitting complete and prompt reports cannot be over-emphasized, and merits the attention of all extension directors.

#### TRAVEL OUTSIDE OF THE STATE

At the Chicago convention in 1919, the policy was adopted to permit each State to spend not to exceed \$500 of Smith-Lever funds for the travel and expenses of workers to meetings, conventions, etc., outside of the State, it being understood that these expenses would be subject to approval by the States Relations Service the same as all others. It was not expected that this \$500 would cover expenses of extension workers to conferences which were jointly called by the States Relations Service and the Association of Land-Grant Colleges. Most of the States have found \$500 sufficient to provide for out of State travel. We recommend that this provision be continued, and that should any State find this limit of \$500 insufficient to meet the needs that request should be made of the States Relations Service for approval to exceed this expenditure with the reasons therefor.

L. A. CLINTON,  
G. I. CHRISTIE,  
P. H. ROLFS,  
K. L. HATCH,  
THOMAS BRADLEE,  
*Committee.*

The report was accepted and approved.

#### CONFERENCE COMMITTEE ON MARKETING

A committee of seven directors of extension was appointed to join with a committee of like number, to be appointed by H. C. Taylor from the Farm Economics Association, in a conference with representatives of the United States Department of Agriculture interested in marketing, to consider and formulate, if possible, a program for marketing work. The following extension directors were appointed: G. I. Christie, Indiana; K. L. Hatch, Wisconsin; T. O. Walton, Texas; L. A. Clinton, New Jersey; J. R. Hutcheson, Virginia; M. S. McDowell, Pennsylvania; L. W. Fluharty, Idaho.

**COMMITTEE ON COORDINATION OF EXTENSION WORK**

After consultation with the Secretary of Agriculture it was voted to have the extension directors visit Washington for a three-day conference with the Department of Agriculture officials for the purpose of bringing about a closer coordination of work between the Department of Agriculture and the State extension services.

**ELECTION OF OFFICERS**

Officers of the section were chosen as follows: Chairman, H. J. Baker, Connecticut; secretary, J. A. Wilson, Oklahoma.

## SECTION OF AGRICULTURE—GENERAL SESSION

THURSDAY MORNING, OCTOBER 21, 1920

The meeting was called to order by the chairman, A. Vivian, Ohio State University.

The following paper was read in the absence of the author, formerly Director of the California Experiment Station:

### PROBLEMS OF AGRICULTURAL INVESTIGATION

BY H. J. WEBBER

In requesting me to present this subject, I suspect that your committee did not expect me to discuss the particular scientific problems with which experiment stations are concerned, but rather the broad, general problems in the organization and prosecution of their work that confront such institutions. The fact that I have recently taken up private agricultural work after a period of thirty years of service in Department of Agriculture and university work, places me in position to state frankly certain views that have gradually grown into convictions in the course of years that I probably would not state so frankly if still connected with official work. There will be difference of opinion regarding all of the points discussed and doubtless general opposition to some. I present them merely as my own conclusions. In writing this short discussion I have purposely refrained from looking up and refreshing my mind on the discussions that others have presented on the same subject in order to be more sure that what I state are my own convictions and not biased by the printed statements of others.

#### WHAT WORK SHOULD EXPERIMENT STATIONS DO?

The type of work that the experimenter should do is always a mooted question. From the standpoint of the Adams Act we desire fundamental work; from the standpoint of our farmer constituents, we need to solve their every-day problems. I think I may testify for the farmer that his main criticism against the experiment station worker is that in so many cases practical information cannot be given. This difficulty is more pronounced in the newer or less developed States than in such States as New York and Illinois, but is a prevalent criticism even in those States. The farmer's criticism usually extends to pointing out certain work that has no agricultural value so far as he can see.

The experimenter, if he has been properly trained, considers science in the abstract, and deals with natural phenomena as such, without reference to practical utility. He is inclined to resent the requirement of considering practical utility and thus there is in general a conflict between what the experimenter desires to do and what the farmer requires to have done.

Agriculture presents all types of problems requiring solution from the simplest problem of determining empirically by trials what plants can be

grown in a certain region to the problem requiring an exhaustive research into the climatic soil and nutritional requirements of the plant and of the region concerned. Certainly many of the problems presented in agriculture are as thoroughly scientific as any problems that could be chosen.

I conceive it to be important at the present stage of development, when men and funds are inadequate in almost all experiment stations, that very generally problems be chosen that require solution to assist agriculture and the solution of which does not lead the investigator too far into the realm of pure science. The investigator in choosing his problem should never question, How can I make this problem sufficiently practical to justify the work? But rather, How can I make the work on this problem sufficiently scientific to derive fundamental knowledge? The important agricultural problems in every State urgently demanding solution are more than sufficient to employ the time of all the men and funds available. For investigators to spend much time on what may be termed "purely scientific" investigations is thus questionable. I very strongly believe in investigation without reference to utility, but I do not believe it justifiable for an agricultural experiment station to conduct such studies. It is of great importance, possibly, to study the structure and size of the atom and the results of such studies might have a profound bearing on chemical methods, but I do not believe that agricultural experiment station chemists should conduct such studies. If experiment stations were to select only such problems for investigations, there would soon be no experiment stations other than those conducted under the Adams and Hatch funds.

Directors of experiment stations are frequently criticized because of what seems to be their preponderating interest in problems of practical nature. Station investigators should remember that the director is continuously on the firing line, receiving communications. It is to him that all agricultural problems are presented and he is a fortunate director if he is not urgently and insistently impugned to have investigations made on many important problems which he finds his station unable to undertake.

It must be clearly recognized that the station must decide what problems should be investigated as good work cannot be done on all problems presented. It seems evident that every few years a station should carefully consider the problems of the State and determine whether sufficient attention is being given to the most important ones or whether too much time and money are not being expended on problems of minor importance or those the solution of which is not urgently needed for the public good. My interest has always been scientific, at least so far as I am capable of understanding science, and I want to see experiment stations do more fundamental scientific work, but it does seem necessary that the problems on which investigations are to be conducted must be chosen largely from those requiring solution to benefit the agriculture of the State.

It is certain that if questioned every station would respond that this is exactly what is being done. Yet is this really true? There are at least three types of men in all of our stations. One type seems instinctively to select the problem that with careful, scientific work will turn out valuable results practically and may yield equally valuable scientific results. A second type selects problems primarily to secure the solution of some scientific problem that has only a distant relation to agriculture. A third type is prone to select problems of purely practical and local value

that have no scientific bearing and are of limited utility. As long as investigators in large measure choose their own problems it is certain that more or less of the work will be poorly directed so far as the solution of fundamental problems is concerned. We must protect the individuality of the investigators but they must more and more be led to seek the cooperation and advice of their associates in choosing investigational problems.

Despite the many years' existence of the experiment stations, many of the most fundamental of agricultural problems are still poorly understood. Who understands the problems of tillage? Does a dust mulch really conserve moisture? What tillage best conserves fertility? What relation is there between the type of tillage and the type of plant? Does tillage merely keep down the weeds and conserve moisture, or is its fundamental effect on the soil organisms and fertility? It may be stated, I think, that practically none of the fundamental problems of tillage have been solved, and indeed on almost no phase of the subject have we any considerable fund of exact knowledge. Our knowledge is built up on hearsay and experience, and is almost wholly empirical.

In irrigated regions where growers frequently pay thirty dollars or more per acre per year for water, one would expect to find much exact knowledge regarding the effect of water, and yet in almost no case is there definite information regarding the effect of too little or too much water, and as yet the optimum quantity is not known in relation to various soils and crops. In no case, so far as I know, can growers obtain the information that will enable them to irrigate their crops with any degree of definite understanding. True, in the determination of the wilting coefficient for a crop on a certain soil and the gauging of the irrigation on such standards, we get a faint glimmer of the exactness with which such farm methods should be applied.

In fertilization, cultivation, seed handling, and storage, and such ordinary farm operations, we are as yet woefully ignorant. The every-day farm problems seem to have been avoided by experiment station workers. The more common the operation, the more important it is that our information regarding it should be exact. The study of the ordinary, every-day practices of the farm requires the study of the highest trained scientists, physicists, chemists, botanists. Such men are not too big for the field, though the field may be too big for the men.

#### ORGANIZE PROBLEMS, NOT DEPARTMENTS

Experiment stations should inventory the agricultural problems of their States requiring solution, and should bend their energies toward the solution of the most important of these problems. The organization of stations into divisions and departments forms in some cases a definite obstacle to the proper organization of the research work on the important problems. Each department head is anxious to have his department grow as rapidly as any other and yet his department may not include the problems on which most work should be done. Indeed the tendency of department heads to want to build up large departments destroys good investigators in many cases and courts jealousy. The investigator should have as little executive work as possible. An investigator wants a good "man Friday" and little else aside from his work tools. Experiment stations



would probably do better work if men were chosen for special problems rather than to extend the force of certain departments. Should I ever enter experiment station work again, all I should want is a problem, a "man Friday," five acres of land, and freedom. We need in the experiment stations more men who will rely on the results of their experiments for reputation rather than on their success as administrators.

#### CONTINUITY OF POLICY IN INVESTIGATION

The democratic movement that is spreading in universities constitutes in my judgment a distinct menace to the proper conduct of the agricultural experiment stations. If the deans and directors and heads of departments are to be elected annually by the staff, there is certain to be frequent change in the leadership, and this condition will scarcely permit of the establishment of broad, general policies and their gradual execution. The improvement of our experiment stations and changes in the nature of their work must of necessity be gradual. The staff must be encouraged and stimulated in the achievement of high ideals. Some one with far-sighted vision should have all of the problems of the State under consideration, and look to their ultimate solution. The work must advance according to some broad plan. I cannot see how the uncertainty of an elective position can attract men of high grade. If a director has no assurance of more than a year in which to work out plans, there will be no plans.

The director of an experiment station should not be an autocrat. He must seek the advice of his staff on important questions. He must be assisted in formulating the plans but there must be someone in authority to give the work continuity. A director seeking reelection would not be an ideal director.

#### BETTER TRAINED MEN NEEDED

The getting of better trained men in the experiment stations is one of the important problems of agricultural investigation. A large percentage of the new men entering the stations do not have the necessary training to do original work. We need more good men with doctorate training. It is imperative. With the possibility of securing employment at salaries of from \$1,200 to \$1,800 per year immediately on graduation from college, what incentive is there for young men to get further training? Yet many of the best students become interested in science and would gladly continue their studies if they could afford to do so. In my experience, a considerable part of the best research work done in any university laboratory is that carried out as major thesis work by doctorate students. Every agricultural experiment station has many problems suitable for doctorate theses, and every year good students graduate and go away that would gladly stay and work on one of these problems for a doctorate thesis if a moderate salary were given him. The least costly of all investigations is that done by the graduate student. Why should not our stations, working as they do in close cooperation with the colleges, employ doctorate students to investigate certain of their problems and thus insure the building up of their institutions with well trained men of superior ability? It appears that hereafter if we are to have good men that take doctorate work they must

be paid while engaged in study, and why should they not be? The doctorate theses from most American universities are good pieces of investigational work. Why shouldn't the student be paid for it? I can see no reason except that in many cases it is not in accord with university policy. In my judgment the policy in such cases should be changed.

#### COOPERATION OF INVESTIGATORS

Much has been said and written recently regarding cooperation and certainly in many cases problems demand the cooperation of several specialists representing different sciences. The agricultural problems that lie wholly within the realm of chemistry or botany or any one science are rather scarce. Usually they cover more than one science. Thus it comes that more and more the value of a scientist is determined by his ability to do team work. The necessity for cooperation is so great and so much has been said regarding it that we are coming to view it as the panacea for all our troubles. I fear that we may forget that after all ideas are developed by individuals and that the great advances in fundamental sciences have not been achieved by cooperative effort but by the concentrated effort of individuals. The germinal idea of any great discovery always arises in the mind of an individual. These ideas cannot be cooperative and the individual capable of producing such ideas must be protected as his mental production is his capital in the field of business as well as in the field of honor. We must certainly see to it, in all work whether cooperative or not, that the individual gets individual credit, otherwise the work will become largely of machine grade and no thinking will be done excepting by the one directing the enterprise. In most cases I believe that problems requiring cooperation for their solution can be divided into sub-problems or phases of the work that can be handled by an individual and published separately in many cases. Joint publications rarely satisfy the minor men as their credit is too general. To retain a satisfied staff, each man must be given full credit for his work and allowed the opportunity of publishing his results under his own name if they are worthy of publication. Individuality must be stimulated and fostered in every way, as we need independent thinkers.

The main place where cooperation is necessary is probably between different experiment stations in different States. Our political divisions are not natural divisions and frequently the problems of one State are practically the same as those of several other States. If the present organization of experiment stations in the different States is to be maintained, it is certainly very desirable that the work be organized in cooperation on many subjects in order to avoid duplication. There is now a marked tendency existing for the investigators in a certain field to get together frequently and discuss their mutual problems. In a few cases general plans of cooperation have been adopted but in no case, so far as I am informed, have such cooperative plans been carried out very successfully. We have not yet developed a system or what may be termed an official method of cooperation. Effective cooperation depends largely upon the compatibility of the men and is usually, therefore, a personal matter. It has not yet been fully demonstrated that a satisfactory official method of cooperation can be devised. We must remember that the idea of cooperation implies the acting together of at least two distinct and independent

forces or institutions. As long as the institutions are entirely independent and free to do as they choose, I do not anticipate a very general advance in the organization of cooperative projects. I believe that a closer and possibly a different organization of the experiment stations from that now existing will be required.

#### THE ORGANIZATION OF AGRICULTURAL EXPERIMENTAL WORK

The most important matter before the agricultural experiment stations, in my judgment, is not the reorganization of their experimental work, but the consideration of their political organization and affiliation. Doubtless considerable will be accomplished by the consideration of the problems under investigation and the systematizing of the work, but the greatest advance may possibly be achieved by some new adjustment of all of the work of all of the stations. Local initiative is important and should be favored so far as can be, but is the condition correct and justified that necessitates men in numerous stations working on the same problem? Under the present organization each station considers it necessary to attempt to determine by experiments the best agricultural practice to recommend in its State. It is true that the different local conditions may render such duplication of work necessary in some cases. This means, however, that the plant pathologists of practically every State where pear blight occurs either have worked or will attempt to work on pear blight. To work on a disease of this nature effectively requires that the experimenter learn the industry thoroughly, as he must know all of the conditions under which the disease occurs. Thus every experimenter dealing with pear blight must take the time to study the pear industry. The same is true in greater or lesser degree in the case of all agricultural problems. It has seemed to me that this condition necessitates considerable lost motion. Why should we not build up a group of pear blight specialists who would work more or less together, and handle the pear blight investigations for the entire country without reference to State lines?

#### NEW ORGANIZATION SUGGESTED

It may well be questioned whether the time has not arrived for an entire reorganization of our agricultural activities and greater centralization.

The writer wishes to suggest that he believes the work of the experiment stations and of the Department of Agriculture should be brought into closer harmony by the establishment of a closer relationship. He would suggest: (1) That each State experiment station should become a State bureau of the United States Department of Agriculture, and that the director of the State experiment station should at the same time be the director of that State's bureau of the United States Department of Agriculture. Thus the director of the California Experiment Station would become director of the California Bureau of the United States Department of Agriculture. (2) That the maintenance appropriation for the agricultural investigation in a State be supplied jointly by Federal appropriations supplemented by State appropriations, as is now done but more nearly like the plan followed in extension work. (3) That the experiment station director plan and direct all experimental agricultural work conducted in the State, in consultation with, and reporting directly to, the Secretary of

Agriculture and to the dean of the State college of agriculture with which the experiment station is organically connected.

The working out of the details of such a plan would involve very careful study and consideration but that a feasible plan could be constructed is certain, as is demonstrated by the cooperative extension service. What needs first to be considered is whether any change of plan would accomplish an improvement. The following are a few suggestions for consideration.

The very rapid extension of the work of the experiment stations and of the Department of Agriculture multiplies the points of contact between the two types of institutions and renders it more and more difficult to secure the maximum results from the funds expended. Funds, whether from the State or from the national government, come directly from the people, and are given to achieve the same results. How can two types of institutions, both with ramifications into every corner of the country, achieve the same results with the same funds that could be achieved if the work was all conducted under a well thought out plan, without duplication or friction and with the greatest possible specialization? Everyone familiar with the conditions knows that in every State there is more or less duplication of work and more or less friction. Certainly by having one director or chief in every State, through which all work in the State is arranged, this would be minimized and the concentration of effort on the important problems fostered.

As an illustration of how the divided authority now acts, the writer will cite one actual case. In a community proud of its achievement, the experiment station was urgently requested to study a certain important problem. Specialists looked over the situation and recommended certain experiments and studies. So thoroughly were the funds and men of the station occupied that it was impossible to take up this work until further funds were supplied. Growers proposed to supply the funds but made a proposition that the station could not wisely accept. Matters rested in this incomplete and unsatisfactory way when an agent of the Department of Agriculture happened to be in the community and his attention was directed to the problem. It happened that he was in position to immediately put men on the problem. The result was that the word spread through the community that no help could be obtained from the State experiment station, but that the national department appreciated their need and gave immediate assistance. Under the conditions existing no individual was at fault in this case; it was clearly a fault of our system of organization. The very large expenditures of the experiment stations and of the Department of Agriculture place us under a tremendous responsibility and we are presenting a divided front.

If the experimental work of the Department of Agriculture and the various State experiment stations were organized in such a way that it became the work of one great institution systematized, it would enable the building up of a group of specialists on each important problem of general nature. Pear blight could be taken up by a group of specialists who would consider this disease from all angles of environment, and if a control could be found for one location it would almost certainly apply to all situations. Instead of the publication of 20 mediocre bulletins by 20 different authors for the constituents of 20 different States a single good

bulletin could be prepared which could be distributed to the constituents of all States where pear blight control was a problem, in any quantity that was thought desirable, and would bring to the various State bureaus equal credit to that now given for a similar bulletin, and would extend the credit of the individual authors many fold because of the wider application and utility of their work. The group of specialists on a given subject could be permanently located at Washington and be assigned to the different State bureaus on request, or could be located at any point from which the work on their problem could best be prosecuted.

The most generally recognized fault of our investigational work at present is the tendency of the individual investigator to work on too many problems. This is sometimes the fault of the individual but it is in large measure the fault of circumstances. The number of problems falling under the scope of any department or division of an experiment station and for which such department assumes responsibility is very large, and the workers in this department feel the necessity of being able to give the best up-to-date information regarding each of these problems. They must not be found wanting in an emergency when information is requested, and their status with the dean or director or with their constituents may be impaired. Too many lapses would certainly lead to a serious question as to their ability to hold down their jobs. They are thus forced to consider a large number of problems even if they do no real experimental work on them, and cannot give the time and study to any single important problem that will insure the most rapid advance of the knowledge of that problem.

#### THE EXTENSION SERVICE NO PROTECTION

When the extension service was being organized it was thought that the extension workers being stationed in the different counties would serve as buffers for the experimental men and thus conserve their time for the more important research work. Apparently this has not been the case, at least not generally. The extension men from their closer touch with numerous communities unearth and bring to attention many new problems. They manifold many times the questions regarding old problems. The experimenter is their source of information and it is recognized as a part of their duty to get from him and translate to their constituents the latest development of his work. The experimenter is too slow. He cannot supply the information fast enough. As a result, therefore, of the spread of the extension work, the experimenter's troubles have been greatly increased.

#### ISOLATION OF EXPERIMENTERS

All of this points to what seems to be an absolute necessity, namely, the general isolation of groups of experimenters who will have no other duty than to advance their investigations as rapidly as possible. This is being accomplished in many of the experiment stations by the gradual segregation of the extension, teaching, and experimental functions. Progress is slow, however, and as yet but few men in the experiment stations are giving their entire energy to experimentation. This segregation would be more likely to be accomplished under a reorganization of the work as here suggested. The extension workers have no duties but that of extension work. They cannot be pulled away from their work when students suddenly

multiply, and so it would be with the experimenters if the organization suggested was put into operation.

#### EFFECT OF ORGANIZATION ON DEPARTMENT OF AGRICULTURE

Under such a plan as that proposed the work of the Department of Agriculture would be largely conducted through the various State bureaus. The great weakness of the work of the Department of Agriculture at the present time is the necessity that the larger part of the force must work at a long distance away from headquarters, without supervision. Hundreds of young men, probably well trained but without experience, are sent out into the States to conduct work and are left largely to shift for themselves. The result is that the turnout of work per man is pitifully small. Such men are working at a great disadvantage and can accomplish little for years. They must train themselves as agricultural investigators without association, libraries or organization. The wonder is that such good work has been accomplished under such conditions. Under the revised plan such men would form a part of the organized work in the State and would have the benefit of the whole organization within the State, the libraries and laboratories, the association, local encouragement and direction. Their work would be a part of the organized work of the State and would not be duplicated. In such problems, for instance, as the control of citrus canker, gipsy moth, and the like, which threaten industries in many States, the work would be greatly simplified by the combination of the experiment stations and the Department of Agriculture.

#### THE RELATION OF THE EXPERIMENT STATION TO THE UNIVERSITY

In a considerable number of our institutions there is more or less antagonism between the colleges of agriculture and the other colleges of the university. There is no justification for this antagonism as we well know, but the matter cannot be fully discussed here. The point the writer desires to make is that this has led to an almost complete separation of the experiment stations from the science departments of other parts of the university. In those States particularly where agriculture is the predominating industry that in a large measure supports the university, why should this be the case? When a problem arises which threatens the main industry of the State, why should it not be the problem of the entire institution? In such States why should not the experiment station include the scientists of the colleges of arts and science? Men in these colleges would frequently be glad to devote their research time to some live agricultural problem, and their ability and service would be of great help to the experiment stations.

#### CONCLUSIONS

The statements made in this paper are not presented as criticism of the work of the experiment stations or the Department of Agriculture. No one recognizes more clearly than the writer the fine work these institutions have done. No one is more certain than he that they will continue to do good work, worthy of high praise. In all great undertakings, however, there are doubtless places where improvement is possible. The suggestions

are made to stimulate thought and discussion on the matters presented. The great problem before the agricultural investigators of the country as I see it is to obtain a more centralized and combined organization. We should consider the subject without the bias of personal interest and from the standpoint of the general advancement of agricultural knowledge.

Director C. D. Woods, Maine Experiment Station, in opening the discussion expressed disagreement with that part of the paper which suggested a danger of experiment station research becoming too fundamental and having too little agricultural bearing. Director Woods expressed the belief that there is greater need of fundamental work in most institutions and that there is a danger of too much superficial work.

He also took exception to the suggestion in the paper that in order to bring about closer cooperation between the Department of Agriculture and the stations, State-Federal bureaus be established with the station director at the head.

A. C. True, States Relations Service, called attention to the difficulties of direct cooperation and emphasized the great importance of the suggestion made by Secretary Meredith that a Director or Supervisor of Research be appointed in the United States Department of Agriculture.

On motion, the paper was referred to the Committee on Experiment Station Organization and Policy, without recommendation.

#### RELATION OF THE AMENDED CONSTITUTION TO THE WORK OF THE ASSOCIATION

Chairman Vivian discussed briefly the relations of the constitution to the work of the association. He reported on replies to a letter sent out to a considerable number of members of the association asking opinions on the constitution. He reported that these replies evidenced a fear that the experiment station workers were not given proper consideration and would not have adequate representation in the organization. He expressed the opinion that this fear was entirely unfounded and assured station workers that the deans of colleges would urge every possible support for this work.

A second complaint prominent in the replies was that under the new constitution the individual sections had curtailed powers. The chairman expressed his feeling that such was not the case.

#### ORGANIZATION OF THE SECTION OF AGRICULTURE

The chairman made the following recommendations:

- (1) That the standing committees on agriculture be continued.
- (2) That the position of bibliographer in agriculture be reestablished.
- (3) That for the coming year three subsections of the section on agriculture be provided for, one dealing with resident teaching, one with experiment station work, and one with extension service, and that each of these lines of work be represented by one subsectional session.

On motion, the three recommendations made by the chairman were adopted, the motion carrying provision for the appointment of the committees concerned and for the formal creation of the subsections named.

L. S. Hawkins, Federal Board for Vocational Education, presented the following paper:

# TRAINING TEACHERS OF VOCATIONAL AGRICULTURE THROUGH THE LAND-GRANT COLLEGES

BY L. S. HAWKINS

The demand for well-trained vocational teachers of agriculture in the United States is far in excess of the supply. According to the best available information very few of the States have a surplus. The office of the Federal Board for Vocational Education is constantly besieged with requests for information as to where such teachers may be secured. There is every indication that this demand will increase rather than decrease. In many of the States there is a waiting list of schools desiring to start the work as soon as a qualified teacher can be secured.

As I see it, there are three possibilities of meeting these demands:

- (1) Increase the number of training centers.
- (2) Lower standard qualifications of teachers.
- (3) Increase the output of present training centers.

Thus far the States have followed the economic policy of designating the institutions already giving instruction in the field of technical agriculture as the ones to carry on the work of training teachers for the vocational schools of agriculture. These institutions presumably were giving adequate instruction to prepare students for the vocation of farming, and would have only to add the professional work which would train these same students also for the vocation of teaching. In following out this policy the land-grant colleges have been the institutions designated by the States for the training of teachers of agriculture.

It is generally conceded that any institution which is to train these teachers should meet certain standards:

(1) The institution should be in touch with the latest developments in the field of scientific agriculture in so far as these developments relate directly to the agriculture of the State. This means that the institution should have the facilities for and be engaged in the teaching of agriculture as a vocation.

(2) The institution should give the instruction in classes in technical agriculture from the standpoint of the use of the results of this instruction in the field of practical agriculture. The institution needs, therefore, farms, farm buildings, farm animals, farm equipment, as well as practical school laboratories.

(3) The institution should be in touch with the farms of the State in order that there may be direct contact with the condition and development of agriculture in the State. The institution should be the center of agricultural activities in so far as they relate to the best principles and practices of agriculture.

(4) The institution should be thoroughly well equipped in so far as instructors, laboratories, farm machinery, farm animals, and other equip-



ment, material, and supplies needed for instruction in the subject matter of agriculture are concerned.

(5) The institution should give strong courses in rural life subjects, such as rural sociology and rural economics. This means that the institution should be in touch with the rural life of the State including rural organizations and societies.

Since the land-grant college in each State has been designated by the State Board for Vocational Education as an institution to train teachers of vocational agriculture, an increase in the number of training centers would mean the equipment of an additional institution or institutions in any particular State, if not equivalent to at least approaching that of a State college of agriculture. This would mean a heavy and added expense which a State would probably hesitate to incur unless the need were clearly demonstrated and shown to be absolutely necessary.

The qualifications of teachers as recognized by practically all of the States include:

- (a) Practical experience in farming.
- (b) Graduation from a four-year course in agriculture of collegiate grade.
- (c) Professional preparation for the teaching of agriculture in the secondary school.

The great majority of the teachers now in service in the vocational schools which are receiving aid under the Vocational Education Act meet these qualifications. Some States have found it necessary to temporarily depart from these qualifications but still hold them as the standard for the State. There is a general agreement that it would be fatal to the progress of the work to lower these standards.

The question which I wish to discuss more at length is that of increasing and improving the output of the present teacher-training centers. My suggestions concerning this question may be grouped under six headings:

(1) A keener realization by administrative officers and the faculty of the importance to the institution of having graduates in such teaching positions.

(a) The agricultural colleges recognize their responsibility for training leaders in the country life movement. The teacher of agriculture becomes a member of the community in which he works and serves a small enough territory to become actively acquainted with all the farmers in that community. He has every-day contact through his pupils with from 10 to 40 of these homes.

(b) The colleges of agriculture desire to secure more students from the farm. The teacher of agriculture comes in contact with just such boys and we all know from experience that a boy usually selects his college and his course upon the advice of a favorite teacher. While the aim of the vocational course is to prepare boys for the occupation of farming, it does not by any means contemplate shutting off from college any boy who has the desire and ability to secure college training for such occupation. The colleges themselves are helping to meet the situation by so modifying their entrance requirements as to make college training possible for graduates of the vocational course.

(c) Thorough instruction in agriculture in the secondary school helps to extend the knowledge of the science of agriculture and produce

a generation of farmers so educated that the extension work of the college may go beyond instruction in the rudiments of agriculture.

(2) The curriculum so organized that a student may in four years get a general knowledge of each of the major fields of agriculture as well as specialized courses in one or more of these fields.

(3) An inclusion in the college curriculum of strong courses in farm management, economics, and sociology.

(a) Every teacher of agriculture should go into the community prepared to function, not only as a teacher of technical agriculture, but as a leader and co-worker in the society of the community. He should understand the economic principles underlying the farming business of the community. He should be able to direct the technical teaching in terms of the community. His instruction should prepare him to get from the community the information about the social and economic conditions which will enable him to suit his instruction to that particular community.

(b) I am not ready to advocate teaching economics and sociology as separate subjects in the secondary school, but I do believe that the teacher of agriculture should be prepared to assist the school as a whole to work out some of its problems in these fields.

(4) A recognition by the college faculty of the importance of their methods of teaching.

(a) If the faculty regard classroom instruction as incident to the more important work of investigation, their students are also likely to regard teaching as a profession of minor importance and hardly worthy of the efforts of a capable man.

(b) If the student's time is wasted through ineffective methods used by the instructor, his appreciation of the value of the subject matter is dulled.

(c) Imitation is one of the strongest instincts. We teach as we are taught. If the college faculty use poor or indifferent methods of instruction, and a student sits under this instruction for four years, it is difficult if not impossible for a few courses in education to counteract or correct the effect. The student thinks of the subject matter in terms of the way or method by which he was taught. On the other hand, if the college teachers use effective methods the students have no difficulty in organizing subject matter for use in the secondary school and the education courses may be built on a background of experience.

(5) The department of education should be as well supported as any other department in the institution.

(a) Number and salary of staff.

(b) Rooms and equipment.

(c) Provisions for supervised teaching including college credit for the teaching and arrangements for necessary work in absentia.

(6) There should be in the sophomore or junior year a two- or three-hour course in principles of vocational education open to all students and urged upon all students, whether they intend to teach or not. Every student will be a member of a community which supports schools, and it is hoped it will be a rural community supporting rural schools. Every

student, therefore, should be informed concerning the meaning and purpose of vocational education.

Such a course would enable the students to get some knowledge of the opportunities in the field of vocational education. Few of the students who enter the college of agriculture know as much about the opportunities in the field of teaching as they do in the various fields of productive agriculture. This course in the principles of vocational education would then serve the two-fold purpose of giving to all students who elected the course information concerning our public schools, and particularly the vocational schools, and at the same time afford those who had an inclination for teaching to decide whether or not they wish to prepare definitely for this vocation.

The States have put a great responsibility upon the colleges of agriculture of this country in selecting them as the institutions to train teachers for the vocational schools. I am sure that every college which measures up to this responsibility will be amply repaid both in terms of service performed and in the contacts made by the institution with the people of the State through the public school system.

Discussion on the subject was continued in the following paper by Dean A. R. Mann, New York State College of Agriculture:

#### THE OPPORTUNITY OF THE LAND-GRANT COLLEGE IN THE PREPARATION OF TEACHERS OF VOCATIONAL AND SECONDARY AGRICULTURE

By A. R. MANN

In establishing any new piece of Federal legislation, applicable to all the States, it is to be expected that during the first few years difficulties will be experienced and adjustments will have to be made. The regulations governing the work must keep it within the purposes of the law, and it is difficult to draft regulations which will apply equally well under the greatly varying conditions in the several States. We must patiently work out the maladjustments which appear. If we can proceed on the basis of mutual confidence and conference, as we have done thus far in the Smith-Hughes work, we can anticipate satisfactory working relations in future and a proper development of the work.

Furthermore, in critically reviewing the progress made in the States in meeting the requirements of the Federal Board for Vocational Education it must be remembered that this work has come upon the States at the most difficult and critical period in their history—when costs are greatest, when it is most difficult to obtain any new funds or positions from the State legislatures, and when our colleges have been struggling for existence. We need to assess our evaluations and criticisms with charity.

Every State in the Union has designated the land-grant college as an institution for the training of teachers of vocational agriculture. There is nothing in the Smith-Hughes Act which designates the land-grant colleges as participants in the use of the funds. I take it, therefore, that there are two main reasons why these colleges in all the States have been designated as teacher-training institutions: (1) They are under public control, as the law requires; (2) in the main, they are organized and equipped to give to better advantage than any other institutions under

public control, the technical training in agriculture which must form such a large and important part of the teacher's preparation. The Federal Board for Vocational Education is not in a position to discriminate among public institutions, but it is empowered to fix the standards that shall obtain in the teacher-training courses. Its only means of selecting institutions is on the basis of the minimum requirements which it imposes. In making this statement I recognize that the Federal board does not directly select any institutions, the responsibility for designating institutions falling on the State boards. But in a large way the selective process originates in the Federal board by reason of the basic requirements which it imposes. The land-grant colleges of agriculture have been projected into an especially fortunate position by the circumstance that the requirements fixed by the Federal board as to courses and equipments can best be met by them. In fact, there are practically no other institutions, probably none under public control, which at the present time are able to meet the requirements in the way of courses and facilities for the training of teachers of vocational agriculture. While this may be counted as an advantage, it contains elements of apprehension for the future of our land-grant colleges unless these colleges fully meet the situation.

Any institution in the country, under public control, which meets the requirements stipulated by the Federal board, is free to ask to share in the use of teacher-training funds with the expectation that its request will be granted. There is no reason why such institutions should not do so if they meet the requirements. To meet these minimum requirements means, however, to duplicate to a no inconsiderable degree the plant, equipment, staff, and courses of instruction offered in the land-grant colleges of agriculture. I am told that in two or three States normal schools have undertaken to assemble the facilities to enable them to comply. It is a serious question whether in the public interest such duplication is warranted. Certainly, in view of the stress under which all the land-grant colleges of agriculture are operating because of inadequate funds to meet the pressing demands which daily are becoming more insistent and more numerous, it behooves these institutions not to foster the growth of duplicating institutions through any neglect on their own part to meet the requirements for teacher-training in vocational agriculture in their own States. This is not a question of institutional selfishness, although there is an important question of self-interest involved. It is a question of obligation to the State, in these days when every State is clamoring for a reduction of State expenditures and is wailing against unwarranted overlapping and duplication in State services, to meet this new task imposed on the States without making it necessary to duplicate machinery for an undertaking which at best is limited in its scope. With a well-equipped teacher-training institution for vocational agriculture in every State in the Union, there would seem to be involved no question whatever as to the ability of the States to provide the training for the number of teachers of vocational agriculture which will be required. At any rate, as a public official I should hold that the established institutions should be fully tested before the States are called upon to finance a considerable measure of duplicating work. If the colleges of agriculture do not comply with the requirements of the work, then there is no alternative but to develop it in other institutions. It can

be done successfully only where there is large development of technical agricultural instruction.

If we are to provide adequately for the training of teachers, certain facilities which we may regard as minimum for thorough professional training must be supplied:

(1) There must be a basis of good work in the technical subject-matter departments in agriculture and home economics. This is self-evident and need not be discussed although it needs emphasis. Two points should perhaps be mentioned: (a) To an increasing degree in the training of teachers will there be felt need for instruction in rural economics, farm management, and rural social problems. In general our college curricula are weak in these important fields. We need to develop these subjects on a substantial basis. (b) In many of our institutions, the technical subjects in agriculture and home economics have been subdivided into too many courses to meet the needs of the group of students preparing to teach. These students cannot spend very many hours in any one division of subject matter, as for example, animal husbandry, if they are to get the rounded and balanced course required of them. I sometimes think we have divided our courses so finely as to make it almost impossible for a student to get a fairly rounded education in four years.

(2) In the field of the professional work in teacher-training a number of difficult problems must be met.

(a) The staff immediately necessary to establish the work is disproportionately large for the number of students taking the work. If we are to provide broad professional training we shall have to accept its relative expensiveness for a time. Personally, I think the importance of the work warrants it. It also warrants giving full time. I doubt whether we shall ever get far in this field by the use of part-time teachers, who must divide their thought and energy with other duties of a different sort. The work is too new, too important, and too full of problems to be shared with other duties. We must avoid the criticism of unsatisfactory and superficial work. In this new field the teachers need much time free for investigation and research. They are better not to have a heavy teaching load in the beginning.

(b) The corollary of the last point is that there will need to be offered a number of professional courses—a larger number than we should ordinarily feel warranted in carrying for a limited enrollment. This procedure will find its justification in the fitness of the graduates for a high degree of professional success in teaching in the schools. The teacher-training is in itself a professional field, calling for well-rounded professional training in addition to technical training. No institution has yet been able to develop all of its departments coordinately. In view of the fact that special outside funds are available for this one field, I think we should not hesitate to develop it fully although it may involve some temporary disproportion among departments. Its importance to the development of agricultural teaching in the States, which is of the highest interest to our agricultural colleges, would seem to warrant such action. This may necessitate temporarily paying somewhat higher salaries to the college teachers in this field.

(c) The most difficult thing for most of us is to provide properly for supervised practice teaching and observation. Our colleges seem to find

this much more perplexing than the normal schools. It is a new kind of effort to which we have not been accustomed. This laboratory practice in a genuine rural high school where vocational agriculture and home-making are offered is, I think, of outstanding importance. I think it should be required of every student who is to be certified for teaching; and it should be given under normal, not artificial, conditions—that is, it should be done in a real vocational school. I appreciate the problems involved in allowing college credit for this work, which seems to be necessary if we are to require it, and also the difficulty in arranging the student's course of study so that he can leave college for a term in order to engage in practice teaching. These difficulties, however, are not insurmountable and we must find means of meeting them. Some institutions have made good progress in this regard. With this goes the necessity for provision for follow-up work with the teachers in service—a matter deserving of special consideration.

(3) Reference has been made by Mr. Hawkins to the alternative of lowering the standards required in teacher-training in order to get the work done. Seldom, if ever, has there been given to any group of institutions so exceptional an opportunity to influence the character of the high school teaching in the fields of its special interest. Agricultural education is still struggling for a fair rating in the academic field. The struggle is on in the high schools as it has been on in the colleges. By virtue of the Smith-Hughes Act and the requirements that have been fixed by the Federal board, we are given the opportunity to set as high standards in the preparation of teachers as we are capable of. The importance of realizing this opportunity, it seems to me, cannot be overestimated.

(4) I am interested in the full development of departments of rural education, teacher-training departments, in our colleges of agriculture for another reason: because of the effect on the character of the teaching in the other technical departments in our colleges. In our own college of agriculture I have already been able to note a most gratifying desire on the part of teachers in these other departments to improve their own teaching. In a number of instances teachers have asked members of our department of rural education to go over their courses with them to examine their organization, method, and content. Many of our agricultural teachers, particularly the younger members, are taking time to sit in the lectures in a number of the courses given by our department of rural education. I am encouraged to believe that in a few years our college teaching will be much improved because of the direct and indirect influences of a strong department of rural education.

(5) Finally, I think there is a high degree of mutual interest in what the States do. If any State college of agriculture should fail to meet the need in its State so that the State board of education had to turn to other institutions or the Federal board had to lower its standards in order to get the work done, the way would be opened to lower the standards elsewhere and encourage unnecessary duplication, with the resulting loss to the land-grant institutions of the opportunity to set high standards for the vocational teaching in the high schools. It would be helpful if we would recognize a measure of mutual obligation in this matter, if we are to fully realize the opportunity that is offered us.

Out of our own experience, in which the teacher-training activities have attained large development, conscious of the privilege which is ours

to see that the vocational instruction in agriculture and home economics in the high schools is given not only by those who have had the benefit of a four-year college course instead of a two-year normal course—which in itself is a great gain—but by those who have also had thorough professional training for teaching; and conscious also of the helpful permeating influence of the teachers in the department of rural education on the character of all the work given in the institution, I speak unhesitatingly for the full development of this work by our land-grant colleges of agriculture.

A. C. True, States Relations Service, called attention to the possibility and desirability of using the men in vocational education for doing research in their fields.

President K. L. Butterfield, Massachusetts Agricultural College, urged the importance of giving some work in the social sciences to the students in vocational high schools.

The chairman expressed his opinion that in the future most high schools would wish to take up vocational teaching in agriculture regardless of subsidies.

D. J. Crosby, New York State College of Agriculture, suggested the importance of making available certain data having to do with the training of extension workers which had been reported in the extension section. On motion by Dean D. W. Working of Arizona it was voted that this be done.

#### ELECTION OF OFFICERS

The following officers were chosen: Section on Agriculture: Chairman, F. B. Mumford, University of Missouri; vice-chairman, W. F. Handschin, University of Illinois; secretary, W. H. Chandler, New York State College of Agriculture. Subsection of Resident Teaching: Chairman, R. L. Watts, Pennsylvania State College; secretary, C. D. Jarvis, United States Bureau of Education. Subsection of Experiment Station Work: Chairman, F. S. Harris, Utah Agricultural Experiment Station; secretary, T. P. Cooper, Kentucky State University. Subsection of Extension Work: Chairman, H. J. Baker, Connecticut Agricultural College; secretary, J. A. Wilson, Oklahoma Agricultural College.

## SECTION OF ENGINEERING

WEDNESDAY MORNING, OCTOBER 20, 1920

The meeting was opened with the address of the chairman of the section, F. E. Turneure, University of Wisconsin:

### ADDRESS OF THE CHAIRMAN OF THE SECTION

BY F. E. TURNEURE

The amendments made last year to the constitution of the Association of American Agricultural Colleges and Experiment Stations may be said to mark the final stage in the process of placing the engineering divisions of the land-grant colleges on a coordinate basis with the agricultural divisions. The Association of American Agricultural Colleges and Experiment Stations is now the Association of Land-Grant Colleges and the Land-Grant College Engineering Association is the engineering section of the Association of Land-Grant Colleges. The responsibility rests now upon this section to justify its existence and to play its full share in the work of the larger organization. Heretofore the question of experiment station legislation has played a large part in our activities; but such legislation has not come to pass and under existing conditions it seems unlikely to for some time to come. We would do well perhaps, therefore, to forget Congress for a time and to address ourselves to more immediate and fruitful lines of work.

What then is the peculiar field of activity for this organization of engineering educators? Our position in this respect is somewhat different from that of the agricultural section. That section is, I believe, the principal or only national organization interested in agricultural education. In engineering education we have the Society for the Promotion of Engineering Education, a society now 27 years old, and one in which we are all interested. Its scope as regards membership is broader than ours and its meetings are well attended. It affords opportunity for the discussion of all phases of engineering education. The question naturally arises then as to what peculiar problems, other than that of Federal support of land-grant colleges, lie within the province of this section that are not adequately covered by the work of the Society for the Promotion of Engineering Education.

The answer to this question may, I think, be found in the Morrill Act itself. The fact that our institutions are supported in part by the Federal Government makes us responsible to it, as well as to the State, and by the terms of the act our duty is to promote the educational interests of the "industrial classes." It would seem, therefore, that the special field of activity of this section is in the promotion of industrial education and research and so far as possible to cooperate with Federal agencies and among ourselves in carrying on this work. Engineering education, as commonly understood and practiced, is almost exclusively of the professional type. Industrial education should go further than this to meet the



terms of the Morrill Act. It should concern itself with technical education of all grades. Little has yet been done in this country, in spite of the Morrill Act, for the education of the industrial classes, except on a professional plane. Many worthy efforts have been made by private individuals but these have generally been thwarted by the ambition of presidents and directors to do the higher grade of work. The field of industrial education of sub-college type has hardly been touched. Should not the land-grant colleges turn their attention more definitely to this problem, and to developing construction through extension courses, night schools, and the like, or cooperate more fully with other agencies in establishing the work. Many land-grant schools are not well located to carry on resident instruction of this character, but they can lead the way in promoting industrial education where it is needed. Where else do we find a body of educators better fitted for this task, or in whom the public and the managers of industries will have more confidence than in the engineering faculties of our State colleges? As a suggestion of the possibilities along this line I may mention the fact that the institution I represent has in operation in the city of Milwaukee a branch of its Engineering College under the administration of the extension division. This was established for the especial benefit of soldier-bonus students of Milwaukee and gives instruction in the first two years of the regular engineering courses and also instruction of sub-college grade. It may be made a permanent institution for the reason that the university can best serve the industrial educational needs of Milwaukee in this way. If universities find it expedient educationally to operate medical and dental schools in large centers at some distance from the main institution, why may it not be profitable for State colleges to carry on industrial instruction in large centers where the demand is not otherwise adequately met?

In still another way may this society differentiate somewhat in its activities from the Society for the Promotion of Engineering Education. The membership of this section is made up of administrative officers and few others attend. This is the place then in which questions of organization and management of research and instruction might well be discussed. Such questions as these and questions of salary, qualifications of teachers, teaching load, etc., can be considered here more adequately and from a different point of view than in the Society for the Promotion of Engineering Education.

There is then, it appears to me, plenty of problems to occupy the attention of this section. Let us endeavor to give to its deliberations our best efforts, to attend its meetings regularly, and to become thoroughly acquainted with each other to the end that the engineering section may do its full share in the work of the Association of Land-Grant Colleges.

#### ENGINEERING RESEARCH

This subject was discussed in the following papers by John M. DeBell, Massachusetts Institute of Technology, Dean C. R. Richards, University of Illinois, W. K. Hatt, Purdue University, and T. H. MacDonald, Bureau of Public Roads, United States Department of Agriculture:

COOPERATION WITH INDUSTRIES BY THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY WITH PARTICULAR REFERENCE TO THE TECHNOLOGY PLAN

BY JOHN M. DeBELL

Systematic cooperation between the Massachusetts Institute of Technology and industries is, in a sense, like Topsy—"It just grew." As soon as the institute had attained prestige in the engineering world, miscellaneous industrial problems of all degrees of complexity began to be accepted or rejected for investigation by individual members of its staff, dependent on the time they had available, the nature of the problem, and somewhat, on the immediate situation of the professional exchequer. While this method was moderately successful as long as industry required but little scientific assistance, it could not, of course, suffice for the demands of present-day industrial operation, nor could it bring recognition of the institute itself as an aid to industry—an administrator, not merely a possessor, of engineering knowledge. Consequently there have been evolved at the institute four independent organizations for systematic cooperation with industry, these being in chronological order:

- (1) The Research Laboratory of Applied Chemistry.
- (2) Course in chemical engineering practice leading to master's degree.
- (3) Cooperative course in electrical engineering leading to master's degree.
- (4) The Technology Plan.

The Research Laboratory of Applied Chemistry maintains a staff of some 25 graduate organic, inorganic and physical chemists and chemical engineers. These men, together with the director, are free from instructional duties, devoting all their time to the researches of the laboratory and keeping in touch with recent developments by frequent conferences. The work of this laboratory is about evenly divided between two types of problems: (1) Those submitted and paid for by industrial concerns, in which results are the property of the company; and (2) "pro bono publico" researches which are published as contributions to general scientific information. Problems, as they come in from companies, are assigned to appropriate personnel, whose salaries, plus 100 percent, and charges for travel and unusual apparatus, are paid by the company. The 100 percent overhead supplies laboratory funds for financing "pro bono publico" research. The laboratory itself, as well as the men actually performing the work, undertakes responsibility for results obtained; and it carefully avoids a frequent error of attempting researches which should be carried out in the plant itself.

The cooperative courses in chemical engineering and electrical engineering, like all institute courses, are based on the axiom that advances in industry and science will be made by men whose essential training is in the broad underlying scientific principles, not in a particular trade. They are both designed to develop concurrently in students the theories of engineering and the appliance of those theories to practice. Under these new courses stations are maintained in some eight industrial concerns where students spend six months or more in direct contact with industrial operation under professors from the institute. Here part of their familiarization is effected by having them carry on researches for which they are

particularly fitted, such as the determination of losses in the soda cycle of pulp mills, and the optimum conditions—financially speaking—of operating particular types of electrolytic cells for the production of caustic soda and chlorin. One research begets another, and frequently these students take as thesis subjects for their master's degree problems of some plant in which they have been working.

The outstanding features in both courses are: (1) Control and direction rest always with the institute staff; (2) men are not used merely as an additional production tool for the manufacturer.

The institute's most recent development is the so-called "Technology Plan." This plan was born of the need for additional financing—the general college contingency during the year 1919—but it has become sufficiently vigorous in its early infancy to demonstrate a real reason for existence, without need of excuse. It is expressed as a contract between the industrial concern and the institute, under which the institute is paid a retaining fee, and, in return, undertakes four things:

- (1) To make available to the contractors its libraries and special files.
- (2) To maintain up-to-date information of its alumni and undergraduates, so classified that contractors can be put in touch with engineers of particular qualifications, for consultation or employment.
- (3) To provide general consultations with members of the staff; and
- (4) To advise on the solution of particular problems; arranging to have these undertaken by staff members at mutually satisfactory fees (additional to the contract fee); or directing them toward engineers or laboratories particularly qualified to handle them.

Thus it will be seen that the institute is retained, in an engineering capacity, much as a legal advisor is retained. And, like legal advisors, it hopes to be of assistance to its contractors in their difficulties which lie in its particular field.

Whole-hearted fulfillment of the obligations incurred under the contract have necessitated setting up a new division—the Division of Industrial Cooperation and Research—whose sole duty is the administration of the Technology Plan. This division, of which Dr. W. H. Walker is the head, is essentially the local agent at the institute of the contracting companies. Its immediate staff consists of only a few men, with necessary stenographers; but it has cooperating with it the individual members of the professional staff, the various testing laboratories, the laboratories devoted to special industries, as textiles, special reference librarians, and the Research Laboratory of Applied Chemistry. It maintains the file of alumni, which it has indexed by subjects and professions, in accordance with the Litchfield system of professional classification; it superintends compilation of bibliographies; and it has on file such information as the apparatus available the facilities of laboratories, and the specialties of members of the staff. In consultation with the agencies above mentioned, it arranges conferences between members of the staff and contractors, and analyzes problems which come in from contractors, with a view to handling them in the most effective way. These problems, which when undertaken at the institute are under the most competent direction there obtainable, may be (1) handled as theses by students, (2) investigated by advanced students, (3) undertaken by staff members, (4) handled by the division itself, or (5) referred to outside consulting engineers who are recognized experts.

Experience has shown that many of the inquiries are proper material for the Research Laboratory of Applied Chemistry, which does not charge the customary 100 percent overhead to contractors under the Plan.

The objection has been raised that such a plan of procedure commercializes the educational institution and stifles prosecution of "purely scientific" research, which, while having no immediate industrial application, is the backbone of later industrial development. This objection is entirely without foundation; not only is pure research not stifled, but it is stimulated by setting aside a portion of income to be used exclusively on "pure" research; there are now being carried out under the auspices of the Plan studies on thermodynamic properties of organic substances and investigation in gels; while plans are under way for extension of this type of work, particularly in physics and physical chemistry.

The success of the Plan so far can be indicated by the facts that over 450 queries have been handled in eight months; some 75 queries are now under research, either with individuals or with groups (one research man went to India); the photostat is busy a large part of the time reproducing theses, and extracts from literature; and over 200 industrial concerns have retained contracts, the majority of them being for five-year periods.

The benefits of this systematic arrangement to the institute, outside of monetary return, are the increased stimulus to members of the staff to keep in touch with industry and the increased acquaintance of students with industrial problems which they will ultimately be called upon to meet—to say nothing of the acquaintance with companies and their personnel. The industrial concerns entered into the arrangement for various motives—to secure their supply of properly trained men, get particular problems solved, to have a regular source of reliable data, or, in some cases, "just to help a good thing along." At their disposal is placed the accumulated literature and experience of technology; unbiased opinions; research facilities, untrammelled by necessity of factory production; an outside view of problems, connecting such problems, not with the particular industry, but with the entire field of engineering knowledge, and lastly—an engineering confidante. It is surprising to note the number of queries which would never have come to a consulting engineer, because the particular concern disliked to admit its ignorance, or considered the affair too trivial to make a special effort for. When they have paid a retainer, on the other hand, they have an incentive to get their money's worth!

Like all new propositions the Plan has presented difficulties which will have to be ironed out before it can be put on a completely permanent basis. Externally, the chief trouble is in establishing full confidence of the contractor and convincing him that he does not need to wait for a question of profound nature or momentous importance before using the institute's resources. This calls for an educational campaign, the development of personal acquaintances, and occasional conferences at the company. The division frequently finds it advantageous to perform free some work which would ordinarily be charged extra. Experience has shown that, once confidence is established, requests from any company increase by leaps and bounds.

You will doubtless recall the old distinction between a chemist and the chemical engineer; that the chemist thinks in molecules, the chemical engineer in barrels. This, in a general way, has been true of engineering

science and industry. It is the desire of the Technology Plan to augment between the two the confident understanding, and appreciation by each of the other's needs and shortcomings, so that there may result that full harmonious cooperation which is conducive to progress.

#### FUNCTIONS OF THE ENGINEERING EXPERIMENT STATION WITH SPECIAL REFERENCE TO COOPERATIVE RESEARCH

By C. R. RICHARDS

Until recently, comparatively few of the engineering industries appreciated the value of research. Now most of them are alive to its importance and many of them have undertaken its promotion by one means or another. A few of the large industrial organizations have developed splendidly equipped research laboratories devoted to the solution of problems of fundamental importance to their own interests and not infrequently to the advancement of pure science. Other organizations have developed laboratories ostensibly devoted to research but really devoted to routine testing incident to the development of new machines, products, or processes. During recent years, a considerable number of trade associations have been organized to study and promote the interests of the firms having membership in these associations, and in a number of them, important research work has been undertaken in laboratories which they have developed, or in cooperation with private or public laboratories. An interesting résumé of the activities of these various trade organizations was presented by Mr. Wharton Clay in an article entitled, "Engineering in Trade Association Work," which appeared in the March 20, 1920, issue of the *Journal of the Western Society of Engineers*.

It is difficult to determine when a single corporation or an association of concerns having a community of interests is justified in organizing an independent research laboratory. The great expense incurred in the operation of such laboratories, the difficulty of securing properly trained and competent men to do research work, and the failure to recognize the nature of the problems to be solved are likely to bring many of these laboratories, as well as research in general, into disrepute. In many instances more satisfactory results may be obtained at a smaller cost through cooperation with private or public laboratories.

Engineering experiment stations have been organized in various colleges and universities in response to a recognition of the need for more accurate knowledge of the materials and processes of engineering and the conservation of those resources upon which the engineering industries depend. The recognized and proper activities of these engineering experiment stations may be classified under six general heads, as follows:

- (1) The conduct of research work which has been initiated by members of the teaching and scientific staffs, and which is carried on by them, employing funds regularly available for the work of the station. In general, the investigations thus undertaken are ones having a peculiar appeal to these members of the staff because of their knowledge of the need for reliable information resulting from their own professional experience or study and their desire to secure it. Such work is particularly stimulating to teachers of engineering subjects and it is generally valuable to professional engineers and to the industries.

(2) The publication and distribution of bulletins presenting the results of scientific investigations conducted under the direction of the station, and of circulars presenting information of importance compiled from various sources, which may not be readily accessible to the clientele of the station. Such circulars are of value to meet a need for digests of reliable information of immediate value to those whom the station was organized to serve.

Too great emphasis cannot be laid upon the importance of these publications. They afford a medium for the prompt presentation of valuable information and data which might not otherwise be readily available to those who can use them. The conduct of research work without the publication of the results represents an expenditure of funds from which no adequate returns are secured.

(3) As the work of an engineering experiment station becomes known, the station will frequently be called upon to furnish information upon a great variety of subjects in answer to specific inquiries. It is a proper function of the station to furnish such information when this can be done by some member of the staff competent to furnish it without special research. In any instance where unreasonable requests are made, which would demand a special investigation requiring the expenditure of much time or money, or which might demand the expression of an opinion based upon insufficient data supplied, the employment of a consulting engineer should be recommended.

(4) One of the most important functions of the engineering experiment station is the training of men in the methods of scientific research, and possibly the chief advantage in organizing such stations in a college or university, rather than as independent research bureaus, lies in the fact that these educational institutions attract many brilliant young men who desire to pursue graduate studies and become prepared to do scientific work. A commercial laboratory or public research bureau cannot offer these opportunities for advanced study under direction. They must, therefore, look to the universities for their supply of research men. The stimulus to those professors who are directing the work of graduate students, working with them in the solution of scientific problems, is doubtless responsible for the fact that very many of the most important discoveries in science have emanated from institutions of higher education.

(5) One of the most frequent demands made upon an engineering experiment station is for commercial testing, varying in its nature from the simple calibration of instruments and tests of materials to the performance of elaborate investigations of materials, machines, or processes, the results of which are to be considered confidential, and available only to the individual or corporation for which the tests were made. Such tests are frequently desired in connection with the invention, development, or improvement of some machine or process to determine the properties of a material to be employed in an engineering structure, or for the establishment of engineering data necessary for the successful design of apparatus or structures. In very many cases such tests are desired by promoters solely for advertising purposes because of the belief that tests made in such an institution will carry the inference that the device or process tested is endorsed by the institution.

It is doubtful whether commercial testing should be undertaken in any

engineering experiment station except under unusual circumstances. Such tests interrupt regular station work, and where an immoderate number of these tests are undertaken, the antagonism of consulting engineers and of commercial laboratories may be aroused. Since engineering experiment stations of the type under consideration have been organized without any thought of financial gain, it is difficult to justify commercial testing except in those cases where the work cannot be undertaken elsewhere and where its prosecution may be of direct or indirect benefit to the community.

Regulations governing commercial tests at the University of Illinois, prepared by the heads of the several engineering departments and the comptroller, are herewith presented:

"Commercial tests or investigations for individuals, firms, or corporations may be undertaken by the University of Illinois, when, in the opinion of the head of the department in which the tests would be conducted and of the dean of the college, it is desirable that the work be done. In general such tests are justified when the result may be of scientific value, or when the necessary facilities do not exist elsewhere or are not readily accessible. Such work will be arranged by the head of the department with the members of his staff in accordance with the nature of their employment, either as a part of their service as scientific employees or as professional work to be done by individual members of the faculty on their own time and responsibility. Where necessary or desirable, special assistants may be employed to conduct a specific test or investigation.

"A fee shall be assessed for each test sufficient to cover all service rendered or assistance employed, all materials used, the purchase of any special equipment necessary, the wear and tear or repairs of equipment already owned, and the use of any and all facilities of the university in carrying out the test. Standard fees may be fixed in advance to cover all tests or investigations of a uniform character. In general, such fees may be required to be paid in advance; where this is impossible through the nature of the investigation, the fee shall be charged at the close of the test.

"All fees charged on account of the university will be reported by the head of the department to the business office and will be collected by the business office and credited as follows:

"(a) To the department conducting the tests in reimbursement for any materials, assistance employed and labor furnished by it and used on such tests, for any materials or special equipment bought solely for use on such tests, and for the repairs of any equipment owned made necessary as a result of such tests.

"(b) To the general funds of the university for the service of all members of the staff when given as a part of their regular university duties, for the use of any and all facilities of the university, and for any portion of the fees then remaining.

"For services rendered in connection with such tests as personal undertakings of individual members of the staff, the university assumes no responsibility. Where it is necessary that the work be done in this way, i. e., performed by the individual as a personal matter but with the use of university facilities, two distinct charges will be made:

"(1) For the services of the individual, made by him and collected by him direct.

"(2) For the service and use of facilities of the university as previously outlined.

"Any announcement made of tests conducted in this manner will indicate clearly that the individual performing the work is to be directly reimbursed for his service, and that the university will be separately reimbursed for such facilities as it may furnish. All details of procedure will be subject to the approval of the dean of the college in which the department is located, and the comptroller.

"In all cases where commercial testing is permitted to be undertaken by proper officials of the university, it should be clearly understood by the

agency requesting such tests that the university as an institution assumes no responsibility for the results obtained."

(6) Cooperation between the engineering experiment station and individuals, firms, corporations, or associations in the conduct of engineering research affords the most inspiring opportunities for the investigation of large and important problems, the solution of which involves expenditures that are too large for any institution to provide; for the performance of a service of immediate importance and of great value to engineers and the public, and for the establishment of relations which will be of mutual advantage to the industries and the station. The chief obstacle to the establishment of such cooperative relations is the still prevalent but mistaken notion that scientific knowledge secured at the expense of a particular industrial organization should be the sole property of that organization to be used exclusively for its own advantage. Obviously, an engineering experiment station supported chiefly by public funds cannot be employed in the exploitation of inventions or processes, or in the conduct of scientific work, the benefits of which are to be withheld from the public. Furthermore, in these days of scientific achievement no organization can hope long to keep a "trade secret," if a competitor really desires to learn the truth concerning it. Undoubtedly, free interchange of knowledge of importance in a particular industry will benefit every concern represented, by standardizing and improving the product, and by establishing the confidence of the public in the product.

Cooperative research should only be undertaken in those instances where its chief purpose is to establish fundamental principles and physical laws which may have a wide, practical application. The establishment of such laws is of direct or indirect benefit to every person, since it permits the substitution of exact knowledge for empirical methods in the design, construction, or utilization of the materials and processes of engineering. While engineers or special industries may be primarily benefited through the extension of scientific knowledge in a particular field, the public is undoubtedly benefited because commodities which it needs may be produced more economically and of better quality.

In establishing relations for the conduct of a cooperative investigation, the engineering experiment station may properly tender the free use of all of its facilities, including its laboratories and equipment, together with heat, light, power, water, etc. It should assume the general direction and administration of the investigation and it should be free to publish all of the results secured and conclusions formulated as a result of the investigation. The cooperating agency may properly provide such funds as are required to pay the salaries of special investigators employed exclusively on the conduct of the particular investigation, and for the purchase of special materials or special apparatus necessary for the work and not already available in the station laboratories. In general, these funds should be paid into the treasury of the institution according to some agreed plan, to be disbursed by the institution in accordance with its usual business methods. In all contracts for cooperative research work which have been entered into by the University of Illinois through its engineering experiment station, absolute ownership of the data secured, together with the right to publish these data and conclusions resulting therefrom, is



reserved by the station. The public is thus protected against the use for private gain of an institution which it supports. The University of Illinois further declines to permit the use of data so secured in advance of the complete publication of the results, unless it be with the understanding that any individual or corporation interested may have equal rights with the cooperating agency.

Under normal circumstances, it is to the advantage of both parties to an agreement for the conduct of cooperative research, to provide for the appointment of a competent advisory committee, which will assist the officers of the station in outlining its program for the investigation, and which will represent the organization cooperating in the investigation, so that the general nature of the problems to be investigated can be determined and so that greater assurances of the practical value of the results may be attained. Obviously, since the station must be responsible for the results secured in any investigation, it must be free to determine the methods pursued in carrying on the work. An advisory committee is desirable and helpful unless it assumes the right to dictate concerning methods and policies.

The following form of contract will illustrate in a general way the conditions under which the University of Illinois, through its engineering experiment station is willing to undertake cooperative research:

ARTICLES OF AGREEMENT between the Board of Trustees of the University of Illinois, Party of the First Part, and ..... Party of the Second Part, for a cooperative investigation of ..... by the University, through its Engineering Experiment Station, a division of the said University, under the following terms and conditions:

(1) This agreement is executed for a period of ..... years beginning ..... with the understanding that it may be extended for additional periods under the same terms or such other terms as may be mutually agreed upon.

(2) The University of Illinois will delegate ..... (or some other competent person should his connection with the University cease) to supervise and direct all experimental work and the computation and reduction of all results obtained, together with the placing of these data into form for presentation; and he will be authorized to give such portion of his time to this investigation as may be necessary for the effective promotion of the work.

(3) The University will furnish the necessary room for this investigation, together with heat, light, power, and water. In addition, it will permit the use of such laboratory apparatus as it may possess, which is not in use for other purposes. It is agreed, however, that all special apparatus necessary for this investigation and not available in the laboratories of the Engineering Experiment Station of the University shall be purchased from, and charged against, the funds provided by ..... for this purpose.

(4) An Advisory Committee acceptable to ..... and the Director of the Engineering Experiment Station shall be appointed to advise with the officers of the Engineering Experiment Station of the University concerning the test program and the conduct of the investigation, and to cooperate in the preparation of all reports. The conduct of the tests shall be under the full control of the University through the Engineering Experiment Station, which is necessarily responsible for the results secured.

(5) (a) All of the records of the investigation are to be the property of the University of Illinois and they are to be kept on file by the Engineering Experiment Station.

(b) The University through the Engineering Experiment Station

shall have the exclusive right to publish the results of the investigation as a bulletin or bulletins of the Station. The bulletin shall contain a detailed description of the investigation and a full report of the results and conclusions. No publicity shall be given to any of the results of the investigation prior to the publication of these results by the Engineering Experiment Station except upon the recommendation of the Advisory Committee and by agreement with the Executive Staff of the Station. In every publication, proper credit shall be given the Advisory Committee and to every one who has made a significant contribution to the results obtained.

(6) The Advisory Committee and authorized representatives of ..... , as well as others interested, shall at all times have access to the data secured and computed results of the tests, subject, however, to the restrictions named in Article 5. The Engineering Experiment Station will submit such reports of progress to ..... as may seem desirable to the Advisory Committee.

(7) All research assistants, mechanics, clerks and other help necessary for the effective prosecution of this investigation will be employed by the University through the Engineering Experiment Station and paid from the fund provided by ..... The members of the special staff for this investigation are to be regarded as members of the Research Corps of the Engineering Experiment Station of the University during their connection therewith.

(8) On or before ..... , the ..... shall pay to the Board of Trustees of the University of Illinois the sum of ..... and thereafter the sum of ..... at stated intervals as follows: .....

It is understood and agreed that the payment of the above sums as stipulated is conditioned upon the conduct of the investigation by the University of Illinois with due diligence so as to secure the greatest possible progress consistent with the nature of the work. If it should appear that, because the rate of expenditure is not so rapid as the rate of payment as indicated above, and funds are unduly accumulating in the treasury of the University of Illinois, payments may be correspondingly deferred.

The money contributed for this investigation shall be held as a special fund and shall be so carried on the books of the Comptroller of the University. Payments from this fund shall be made only on vouchers approved by the Director of the Engineering Experiment Station for this work. At the close of each year covered by this agreement, the Comptroller will render an accounting to .....

In the conduct of research work a new process may be discovered or inventions perfected having a commercial value. After several unfortunate experiences of this kind in the engineering experiment station of the University of Illinois, it became evident that some policy should be established which would safeguard the interests of the institution and of the public which created it and which it serves. After mature consideration of the questions involved in this very important matter, the following regulations were formulated by the officers of the engineering experiment station and approved by the board of trustees:

"In connection with work of the College of Engineering and the Engineering Experiment Station, discoveries or inventions of commercial value will occasionally be made, and it is desirable in such cases that the interests of the University and of the public be safeguarded. The University of a State institution supported by public funds, and it is its duty to preserve for the use of the public all benefits accruing from investigations made by the University or under its auspices. A procedure should be followed which will conserve the rights of the University and of the public in the utilization of the discoveries and inventions and which will preclude the appropriation of the results of investigations by private interests through patents or other restrictions in such a way as to deprive the public of advantages and benefits properly belonging to it. It would

seem that a proper way to safeguard all interests lies in taking out patents and in administering such patents in a manner which will best serve the interests of the public, the University, and the workers in the University.

"To insure the protection desired, the Executive Staff of the Engineering Experiment Station recommends

"(1) That the principle be recognized that the results of experimental work carried on by or under the direction of the scientific or teaching staff of the College of Engineering and the Engineering Experiment Station and having the expense thereof paid from the University funds or from funds under the control of the University belong to the University and the public and should be used and controlled in ways to produce the greatest benefit to the University and the public.

"(2) That in case of valuable discoveries and inventions resulting from experimental work or of discoveries and inventions which may be expected to have a basic relation to other discoveries or inventions of commercial importance, the practice be established of taking out patents to be controlled by the University, and that any member of the scientific or teaching staff of the College of Engineering who has made a valuable discovery or invention as the direct result of his regular duties on University time and at University expense may be required to patent his discovery or invention, the expenses connected therewith to be borne by the University.

"(3) That application for a patent to cover such discoveries or inventions shall be made in such cases as are recommended by the Staff of the Engineering Experiment Station and approved by the President of the University, and that upon its issue the patentee shall assign the patent to the Board of Trustees of the University of Illinois for a nominal consideration.

"(4) That the Board of Trustees administer the rights under the patents in ways to suit the conditions—dedicating the patent to the public or licensing its use. In case of license, the license shall be made with provisions for the use of the patent that will safeguard the public during the life of the patent from unreasonable restrictions or exorbitant royalties for the use of later patents which may depend upon a University patent for their usefulness.

"(5) That in the event any sum above a nominal royalty is received by the University for the use of the patent a proper share of it shall be paid to the patentee.

"(6) That in the case of cooperative investigations special agreements for preferential licensing may be made with the cooperating interests with a view to compensating for the assistance rendered in the investigation.

"(7) That the action herein proposed shall not be construed to include questions of ownership in copyrights on books or of inventions or discoveries made by members of the teaching or scientific staffs outside their regular duties and at their own expense."

While such regulations concerning patents may not be so important in privately endowed institutions, they are, for reasons stated elsewhere in this paper, of very great importance in publicly supported institutions, to prevent the possibility of destructive criticism which would follow any use of the institution's facilities for the development of inventions or processes for private gain. It is believed that the sixth clause, which provides for preferential licensing for the use of patents taken out as a result of cooperative investigations, is as far as such institutions may safely go in dealing with problems connected with such patents.

## COOPERATION IN RESEARCH

BY W. K. HATT

To clear away a possible misconception, let me say that what follows applies to experimentation in the field of structural materials, and not to the work of agricultural experiment stations, of which I know nothing.

In the writer's experience there are two varieties of research for systematizing previously unassorted phenomena.

*First*, a sort of mechanical experimentation in which the various influencing factors are, one by one, isolated and the effect of each determined upon a previously defined result. For instance, there is the effect of speed of test upon the strength of steel, or the effect of water content or size of grain upon the strength of cement mortar. The work demands order, carefulness, industry, and mechanical instinct. Probably the large portion of engineering experimentation is of this kind.

Successful prosecution of important work in this field demands the projection of a carefully prepared working plan, and quite generally, a cooperation with producing agencies and a fairly large expense budget. As will be seen, these necessities restrain the experimenter in the case of large projects. There is not the freedom to depart from the agreed upon plan, and consequently the results, in certain fields at least, are of only temporary value and at times are rendered somewhat valueless by ignorance of the true and underlying factors of control not foreseen, but which might have been discovered by an investigator who worked more in the capacity of a free lance before the formulation of the large investigation. That is, a detailed plan of campaign is made for an unmapped country.

*Second*, there is a variety of experimentation by an individual of insatiable curiosity who will not conform to a large organization or submit to a definite working plan in advance. If he does, it is with mental reservations. His work is that of the pioneer, to range over a wide field and discover principles of action, chasing each animal out of its bush. This pioneer is only hindered by cooperative work. He is instinctively obstinate. He does not need an expensive equipment and elaborate organization. The university laboratory is best fitted for this type of work.

This view has been well expressed by Mr. Arthur D. Little in the Topical Conference on Cooperation in Research in the Proceedings of the American Society for Testing Materials for 1918, who says:

"In considering any plan for the organization of research, one is immediately confronted by the difficulty that science in its highest expression is essentially individualistic and democratic. It resents autocratic control, languishes and becomes sterile under minute oversight and direction from outside. The great advances in human knowledge have almost invariably been due to individual effort set in motion by the scientific imagination and sustained by a consuming desire to ascertain the truth. Pasteur, Curie, and Rutherford were not dependent on organization for their results. They worked to the best advantage in proportion as they were free to follow the vision which moved before them. No amount of organization can make a Faraday. It may, perhaps, discover one and is then privileged to provide encouragement, working facilities, and recognition. With these assured it is the part of wisdom to leave him as much alone as possible.

"Any really effective plan of research organization must provide for the exceptional man, the man whose angles have not been ground down,

who is sometimes not comfortable to rub against, but who has the spark of genius. He is usually a man who hates rules and systems, regular hours, time slips and all the paraphernalia of organization. Organization can help him, none the less, by relieving him of burdens, making him master of his own time, furnishing equipment, providing organized and immediately available library facilities and by directing his attention to specific problems.

"While the superlative work in science, like the superlative work in art, must always be an expression of the genius of the individual and quite beyond the power of organization to ensure, there remains a vast deal of what may be called the secondary work of rounding out the great discoveries and especially of giving them an industrial application which may be rendered most effective only through proper organization. The nimbus which, just at this time, surrounds the word 'research' should not blind us to the fact that research involves a great deal of hard work—work for good honest plodders who accumulate the data which permit or confirm the generalization or which are required to give it practical effect."

Perhaps to make this matter clear I may cite examples.

A systematic collection of data of the strength and physical constants for the various species of timber in the United States is of the first variety of experimentation. There is no opportunity here for individual action. The results will not be of value unless the operations of collecting, testing and computation are standardized.

But this end can only be reached after a true understanding is had of the importance of all the elements which enter into the results. For instance, one of these is the effect of moisture, an element mainly disregarded by earlier timber tests and which has rendered valueless a large part of the early systematic data. The true law governing the effect of moisture on the strength of wood was finally discovered by an individual investigator, undisturbed by the necessities of control and reporting of a large organization. He was indeed a part of the organization, but the directing head gave him his freedom. It was this same man, who with the same characteristics, ascertained the true principles governing the abstraction of moisture from wood during the process of kiln drying, and devised a kiln, which has been used with such success in wood-working industries and later in the exigency of aeroplane manufacture in war time.

Programs of systematic work in timber tests, covering widespread experimentation were entered into too early.

While it is invidious to mention names, but to take a striking example, the work done in the laboratory for applied mechanics at the University of Illinois under the direction of Professor Talbot has been of an independent character and has disclosed fundamental principles of operation of the mechanics of reinforced concrete. A band of researchers has also been trained for use in industrial fields. Now let us suppose that the work of this laboratory of the University of Illinois had been governed from a central bureau. Does anyone believe that the activities of this laboratory would have been as beneficial to the engineering profession? For one, I do not.

The point that I wish to make is that there is a great tendency to come into large cooperative organizations for the accomplishment of engineering experimentation, or experimentation of various kinds, too early. We must first leave the individual worker and the individual university unshackled until we know enough about the controlling factors to intelli-

gently plan large cooperative schemes. I think it better to leave the university laboratories to work in the second field of experimentation.

Again, for the past 15 years an enormous amount of data has been collected in various cooperative efforts to determine the laws governing the assemblage of water, cement and aggregate in the materials for concrete, and the relation of these to various exhibitions of strength. But it has remained for an individual investigator, Professor Duff A. Abrams, in an individual laboratory, free from outside control and with a sense of individual responsibility to clear up this field only recently and tell us that what is called the water-cement ratio, that is the volume of water in relation to the volume of cement, controls our results, and that this, in conjunction with the sizing of the aggregate, as expressed either in surface area or some function of the surface area, is the fundamental thing.

In the early history of concrete testing the necessity for standardized tests on uniform materials by uniform methods was insisted upon by those who wished to control the eccentric efforts of the individual laboratories in universities around the country. It is hard to know who is eccentric until the center has been established. Therefore, universities should carefully consider the many invitations to cooperate which are being extended by various over-head directing organizations, such as various departments of the United States Government and national organizations. Is this their appropriate field of work?

These views might be entirely controverted by the consideration of what was accomplished under war conditions by organized scientific research. I do not know. Neither do I wish to take the position that all that is necessary in astronomical observations is an interested individual in his backyard with an opera glass.

Let me give some of my experiences with cooperative research of the first class, namely so-called "mechanical research."

When I came to Purdue University in 1893 I found cooperative research well established under Professor Goss, who had a remarkable insight into real and fundamental problems of the railroads in mechanical fields, and had established fruitful relations with the organized bodies of technical organizations, like the Master Car Builders' Association and the American Railway Engineering Association, through the technical committees of these organizations. The resources of the university staff, the desire to be of service, the supply of materials and apparatus by the railroad men, the pursuit of planning a program for a period of years, and the unshackled leadership of the university type of mind were essential in this situation. This sort of cooperation is ideal. There was a fruitful union of the university type of mind as a leader and the knowledge of the vital problems and real conditions on the part of the technical railway men. There was no paid staff of university experiment station operatives. But certainly significant researches were carried out by university undergraduates under the direction of the professors.

Later, in 1902, I was with the Forest Service, United States Department of Agriculture, when Mr. Gifford Pinchot, then chief forester, desired to resume the investigations of the physical and mechanical properties of the United States timber, which had been begun by Forester Fernow and the late Professor J. B. Johnson. The former investigation of the Forest Service was modeled upon the European program whose purpose was to

correlate the Silvicultural investigations with the resulting properties of the wood of the trees. In the German forest, for instance, the growth had become standardized to a large extent through selected seeding and other controls. Therefore, there was a greater possibility of applying such a program there than in our forests, which were wild, uncontrolled and of mixed lineage. It did not seem best to pursue the former program.

It was the policy of Mr. Pinchot to engage the interests of industries on all sides and secure their cooperation in the general forest policy of the United States Government. Therefore, the first step was to learn the real problems of the railroads, vehicle and other industries, architects and structural engineers, and to reach conservation through the standardization of grades, so promoting a clear understanding between the producers, the saw-mills, and the consumers in the industries. Of course, one by-product of such work would be the support of these organizations in obtaining appropriations from Congress for these activities. Naturally it was necessary to come in close touch with various technical and manufacturing organizations, attending their meetings and, after the results of tests were available, to apply the conclusions through the technical committees of these societies. All this is good.

"Cooperation" between a Government bureau and these societies thus arose. The word "cooperation" was in later years somewhat over-worked; and one engineer of the Pennsylvania Railroad expressed his view that the word was offensive, and his organization could solve its own problems.

Since the Forest Service had no equipment or laboratories of its own, work was begun in the testing laboratory of the Bureau of Public Roads at Yale University. Testing stations were then established at Purdue University, University of California, and the University of Washington; and a testing station was operated at the St. Louis Exposition, where in particular, an experimental wood preservation plant was set up and connected with a testing laboratory, to work out some of the technical problems relating to the strength of preserved wood. The major part of the program was later carried out at Purdue University.

This cooperation with scattered stations was not efficient.

The policies of the Federal bureaus alternate in time between, first, a policy of bringing activities into Washington where there may be direct contact between the management and the work, and where members of Congress may have a personal view of what is going on, and second, a policy of close contact with the regional problems throughout the United States, resulting in local stations.

At this juncture it appeared desirable that the various viewpoints of the chemist, the testing engineer, the wood chemist, the wood microscopist, and the industrial engineer should be combined in one large testing station. Various universities were approached to determine possibilities and it was finally decided that the very favorable offer of the University of Wisconsin should be accepted, with the result that a forest products laboratory was established in cooperation with the University of Wisconsin at Madison, where an ideal organization was effected with 80 employees, increased during the war times to almost 500 persons. This laboratory was closely in touch with all of the interests which it should serve, the supervisors of the forest reserves, the various industries, and the technical associations. The directing staff was recruited from the employees trained

during the early years of these timber tracts. This is an example of a case in which cooperative agreements with various local organizations were finally merged into a single individual laboratory where work could be carried on under a unified organization with component parts properly related, and free in a large measure from bureaucratic control and absent treatment.

During the years 1900 and 1902 there was a keen and rising interest in the technical problems relating to concrete and reinforced concrete. Upon the initiative of the late Dr. Holmes, then of the United States Geological Survey, and under the direction of Mr. R. L. Humphrey, a testing station was operated at St. Louis Exposition in 1904 with a purpose of a systematic examination of the aggregates collected from the various portions of the country, and a determination of the effect of various operations in mixing and curing upon the strength of the resulting concrete, and the disclosure of the mechanics of reinforced concrete beams. The program was devised by a committee consisting of Mr. Humphrey, Professor Talbot, Professor Turneaure, and the writer. Portions of the program were carried out at cooperating universities, centrally controlled with fixed report forms, and inspected from time to time. Publication of this research contains a mass of very valuable measurements, but leaves something to be desired in the way of significance in these later days. It was probably too early to resort to a too systematic and ambitious plan.

Through the initiative of Dr. Holmes, President Roosevelt, about this time, appointed a National Advisory Board of Fuels and Structural Materials, which contained possibilities of cooperation between the Government and various influential persons, but this interesting project lapsed.

The Bureau of Standards then came into increased power and prominence. It was a militant organization absorbing the Watertown Arsenal, which had been the center of testing work of a high technical standard, and taking over the investigations of structural materials from the Geological Survey. Its policy appeared to be to enlarge its field, from the determination of standards to all kinds of technical and technological investigations. The Bureau of Standards has been active in offers of cooperation, rather to industrial organizations than to universities.

Recent developments in organizations for cooperative research are a matter of common knowledge. A list of some 360 industrial laboratories is given in the Proceedings of the American Society for Testing Materials for 1918 connected with an excellent topical discussion on cooperation in industrial research. Some distinction was drawn between "industrial research" and so-called "scientific research," and Mr. Little does not admit the distinction.

The most seriously undertaken effort to coordinate research facilities of the country and to mobilize their energies is resident in the National Research Council. It recognizes that individual freedom and initiative are of fundamental importance. The industrial research section of the National Research Council proposes to finance and direct extended laboratory investigations on a large scale, experimentation and development work required for adequate industrial research.

The Engineering Foundation endowed by Ambrose Swasey cooperates in engineering researches. There is a National Laboratory for Invention and Research with the National Executive Committee. There is a Federal



Highway Council, which has taken over the work of the Highway Transport Committee, which is particularly interested in promoting the widespread research in highway construction. All of these organizations can, no doubt, be of great assistance to universities by preparing lists of research problems which are significant, and can so stimulate the efforts of the ordinary routine worker.

Thus the idea of cooperation is widespread and the average university man has many offers open. The national associations or corporation schools, for instance, will cooperate with technical schools in guidance of their curricula so as to best prepare graduates for service in the industries. The Bureau of Education has committees at work in the study of curricula to best prepare men for the duties of highway engineer and for foreign business engineering.

No doubt all of these organizations are engaged in useful work. A university man must, however, preserve the integrity of his organization and it might be easy to be distracted by too many outside contacts. We must remember that at times the men who are engaged in cooperating organizations are often as busy as the professors and it is likely to result that the fine organization chart does not mean a real efficient organization. Those who have had experience in the work of so many committees of technical organizations will realize that very often committee work is done in a perfunctory manner; and the work of an individual on the committee is generally below his normal standard. In these days of organizations the university man must, therefore, decide in what field his energies may be applied and it may be wiser for some to keep free from entangling alliances.

While this paper may represent only one side of the case and that somewhat too strongly, the writer's opinion is that the university works to the best advantage in the purely scientific field for the determination of fundamental facts and constants, the development of theory and the establishment of general principles, and in assistance to individual industries on special problems; and that this duty may not be performed if the university laboratories get enmeshed in the machinery of cooperative organizations.

#### • HIGHWAY ENGINEERING RESEARCH

BY THOS. H. MACDONALD

As a background for these observations, it may be germane to say that my own earliest experiences in highway work were in connection with research and investigational studies undertaken by direction of the General Assembly by the land-grant college of the State of Iowa, and for which a small appropriation was provided for "good roads experimentation." The conduct of this work laid the foundations for a basic road law establishing a State highway department and providing many of the general principles which are common to modern highway legislation. Even after a State highway department was established under a different board than that of the educational institution under which the work was first started, contact in all lines of research and investigation was closely maintained between the State Highway Commission and the college. It is my personal belief that this contact has proved a stimulus and a source of strength to

both the educational institution and the highway department, and it is on the basis of a firm belief in such relationships that these thoughts are presented.

The entrance of the Federal Government into the field of highway improvement through the Federal Aid Road Act has added a third agency, and has established a new point of contact between the Federal and State Governments, which can and should prove most useful in furthering this great public undertaking—the improvement of the public highways.

Without dwelling too long on the statistics involved, it is perhaps not out of place to refresh your minds with some of the figures with reference to the growth of the motor vehicle. In 1906 the total registrations were approximately 48,000 cars. Thirteen years later there was a registration of 7,565,446 motor cars, including commercial vehicles, but not including 241,000 motorcycles. It was not until 1914, however, that the total registration reached 1,700,000, so that the rapid increase in the use of motor vehicles has been in the last five years. The most significant factor, however, has been the growth in commercial vehicles, particularly motor trucks. It has been estimated that at the end of this year there will be not less than 1,000,000 commercial vehicles in operation on the public highways, and this development has practically all taken place in less than five years.

A very similar story is told by the expenditures for road and bridge construction. In 1906 only about \$70,000,000 were expended. By 1914 this had grown to \$250,000,000. In 1919 the approximate expenditure was \$400,000,000. In 1916 the Federal Government appropriated \$75,000,000 as Federal aid extending over the succeeding five-year period. In 1919 an additional appropriation of \$300,000,000 was made. The expenditure of these funds was so delayed by the war period that at the beginning of this year it was estimated that more than \$600,000,000 were available from all sources for highway improvement.

There is a common expression that the use of the highways has increased tremendously, and this is evidenced by the concrete facts of motor vehicles in use and the expenditure of public funds for highway improvement. Analyzing this general fact we find, among others, the following specific conditions:

(1) A very large increase in the total number of vehicle-miles per year in each State. For a distinctly agricultural State it is estimated that 500 percent increase is conservative, while in the more densely populated districts the increase will be at least 1,000 percent and in specific cases much higher.

(2) An increase in the unit weight of vehicles carried. An investigation covering a large number of farm-owned trucks in the Eastern and Corn-belt States has shown that the farmers as a class are adhering to trucks with a carrying capacity not much greater than the loads customarily hauled by horse-drawn vehicles, but that the commercial truck user is demanding upwards of 15 tons gross weight of vehicle and load, with a net load capacity of about  $7\frac{1}{2}$  tons, but because of the tendency to overloading, the gross loads in some instances far exceed this figure. We have authentic records of loads as heavy as  $18\frac{1}{2}$  tons.

Another highly important weight factor is the concentrated axle and wheel loads. Up to the present time too little attention has been given the

adaptation of the design of the load-carrying vehicle to the track over which it must run.

(3) The speed has greatly increased. A good driving team might travel eight miles per hour, and a farmer's draft team drawing a reasonable load perhaps three to four miles per hour. Passenger vehicles are now expected to run 25 to 35 miles per hour, the latter figure being a legal limit in some States, while the commercial vehicles are demanding a speed of 15 to 25 miles per hour.

(4) Radius of travel has lengthened, demanding longer continuous routes.

(5) The number of hours per day in which there is considerable traffic on the road has increased.

(6) Continuity of highway service is demanded throughout the year. All of these factors have brought about, not an evolution in highway improvement practices, but because of the short time involved, what may be termed a revolution. At the present time the situation is aggravated by other factors such as the much higher cost of highway materials and labor, the increased interest rates for money, and the advancing cost of operating motor vehicles.

Since the present highway building program was set in motion there have been most serious handicaps from lack of rail transportation for materials. It is not to be doubted that had sufficient rail transportation been available, other economic limitations would have appeared successfully, and among these the lack of sufficient engineers to properly supervise the carrying on of such a large program. From a national point of view, therefore, two major problems have developed, the first of which is educational and the second investigational.

The first of these—the educational problem—while perhaps not properly a part of this subject, should be in such a gathering at least touched upon to a sufficient extent to bring to the attention of engineering educators the situation as it exists. In May of this year, at a conference called by the Commissioner of Education to discuss highway engineering and highway transport education, the fact was brought out, resulting from a survey of the organizations employed by the State and Federal Governments on highway work, that all of the civil engineering graduates of the institutions could be absorbed in this one field of engineering, while, as a matter of fact, it was probable that only a very small percentage of these graduates would find their way into this field. The fact was also developed that a very large number of competent mechanics and drivers should be trained each year, probably through extension agencies and in short courses conducted by the educational institutions. As a result of this conference a permanent committee was formed, of which the Commissioner of Education is chairman, and on which the Bureau of Public Roads, the War Department, the Society for the Promotion of Engineering Education, and the motor vehicle and accessories industries all have representation. It is the function of this committee to assist in bringing about a very much more intensive educational program, and to establish cooperative contacts with educational institutions for the purpose of bringing the great importance of these questions into prominence.

The need for educational development along highway lines lies not alone in the training of highway engineers and automotive engineers, or in

the development of extension and short courses, but it extends to the education of the public generally in the proper use of highways, in the broad economic principles involved, and in the proper observance of necessary safety rules and regulations. It is proposed to make this movement a national cooperative one among all interested agencies, and it is hoped that because of the large public interests involved, this program will receive the sympathetic cooperation of the land-grant colleges.

Turning to the other major problem—that of research and investigation along highway engineering and highway transport lines—it has been recognized that a great national program is needed if the public interests are to be served by properly built and maintained highways, and if the construction of these highways is to be put upon an economically-sound financial basis, so that the funds expended will prove investments returning the highest possible percentage of dividends in the service rendered. For the next quarter of a century improvement of public highways will be the greatest single public activity, and will require such enormous sums of money that these expenditures should and must rest upon the soundest principles of engineering and economics.

There are many agencies interested in these problems, and whose efforts should be correlated into one comprehensive program. It is highly important that while this program should be pre-conceived as a whole and each undertaking formed as a component part, the actual working out of the problems should go forward in such a manner that individual initiative will be encouraged and local conditions will be met. It must be recognized that while the improvement of highways in the aggregate is of national concern and has been so recognized by the Federal Government in making available large sums for encouraging road building, the important problems of research and investigation are more or less local. The underlying principles of sound construction or maintenance, or of economics, while remaining the same, are subject to an infinite number of variations dependent upon local conditions of topography, geological formations, population densities, development of industries and such modifying circumstances, as to render the proper solution of these problems necessary through a decentralized organization. To bring such a movement into being on a national basis, seems properly to be a function of the National Research Council. Broadly speaking, the program can be divided into the following main undertakings:

(1) The problems relating to the construction and maintenance of highways.

(2) Those relating to their operation.

(3) Their economic value.

Under one of these headings it would seem that any problem with reference to our highways could be properly fitted.

Perhaps there is one master problem which should first be solved as a foundation for all others. We would be on a very considerably sounder basis now with reference to highway legislation, appropriations and organizations, were this investigation complete. This problem is that of highway traffic. It is of such importance alone as to demand a study, comprehensive and accurate, in every State, and one which first of all might well engage the attention of those agencies which are interested in the fundamentals of knowledge necessary for the carrying out of large public

undertakings. It may be said in passing, that this problem has become acute in other countries as well, and is now engaging the attention of both the English and French national departments of highways to the extent that detailed and accurate studies of highway traffic in both of these countries are being undertaken.

The National Research Council is a correlating body, and under this plan the Federal bureaus concerned or those which, in exercising their proper functions, could lend aid to the solution of these problems, the State highway departments of the individual States, and the educational institutions, could institute cooperative research activities. As an example, there has just been put into effect a cooperative agreement between the University of Maryland, the State Highway Department and the Bureau of Public Roads, by which certain problems of highway research will be taken up at once. It is probable that the first of these cooperative problems will be a comprehensive study of highway traffic, and the work will be done under the immediate direction of the dean of engineering of the university.

The program proposed under the National Research Council is already under way, and committees have been appointed on the Structural Design of Highways, the Study of Properties of Road Materials and Their Combinations, and the Economic Theory of Highway Improvement. These committees are functioning, and valuable results have already been obtained. For the purpose of broadening this program to the extent of enlisting all the interested agencies, the National Research Council proposes to hold a conference in November. It will be the purpose of this conference to outline a broad program of research and investigations along highway lines, in which every agency possible will be enlisted for the purpose of obtaining some fundamental data which can be directly applied in the large investments which we are making and will continue to make for highway improvement. In such a program some of the individual land-grant colleges have already expressed the greatest interest, and at least one such institution has made available both research funds and personnel.

The land-grant colleges have been great beneficiaries from the Federal aid principle so long ago adopted by the Federal Government. The great increase in the number of technical schools which were established immediately following the passage of the Morrill Land-Grant Act in 1862 has had a counterpart in the great increase in the funds which have been made available for highway improvement and the construction programs undertaken since the passage of the Federal Aid Road Act in 1916. The facilities of these colleges which have been developed through the years since 1862, and the trained personnel, are now needed in the program of highway research and investigation which is necessary to insure the proper expenditure of the funds for highway improvement. It is my earnest hope that cooperative activities may be established in many of these institutions along these general lines to the end that a great national highway research investigational program may be instituted and carried forward without delay.

**REPORT OF COMMITTEE ON COORDINATION OF ENGINEERING EXPERIMENT  
STATIONS AT LAND-GRANT COLLEGES**

The Committee on Coordination of Engineering Experiment Stations at Land-Grant Colleges presents its reports in four sections, as follows:

- I. The present situation as to engineering experiment stations at land-grant colleges.
- II. Immediate organization of engineering experiment stations at all land-grant colleges.
- III. Coordination of engineering experiment stations at land-grant colleges.
- IV. Engineering experiment station recommendations to the Association of Land-Grant Colleges.

**I. THE PRESENT SITUATION AS TO ENGINEERING EXPERIMENT STATIONS AT  
LAND-GRANT COLLEGES**

Your committee finds (from data obtained by a questionnaire sent to all the colleges) that the land-grant colleges can be classified as to engineering experiment station conditions in four groups as follows:

*Group A*—Data regarding land-grant colleges with engineering experiment stations already organized are given in the following table:

STATE	Date exp. sta. founded	Regular annual funds	Special funds	Number bulletins already published
*Colorado .....	1917	\$15,000	.....	4
Illinois .....	1903	85,000	\$30,000	125
Indiana .....	1917	15,000	.....	7
Iowa .....	1904	35,000	.....	58
Kansas .....	1913	5,000	.....	10
Maine .....	.....	.....	.....	.....
Maryland .....	1920	.....	.....	.....
*Massachusetts .....	.....	.....	.....	.....
Missouri .....	1909	3,000	.....	21
Ohio .....	1915	10,000	.....	17
Pennsylvania .....	1915	10,000	.....	29
Texas .....	1914	2,500	.....	22
Washington .....	.....	5,000	.....	6
Wisconsin .....	1917	5,000	.....	...
Totals .....		\$190,000+	\$30,000	299+

\*Branch of agricultural experiment station.

\*\*Massachusetts Institute of Technology, Division of Industrial Cooperation and Research—not interested in land-grant college cooperation.

It is both surprising and encouraging to note the number of States that have already organized engineering experiment stations (or their equivalents) at land-grant colleges, that these stations have research funds totaling more than \$190,000 annually, and that they have already published over 300 engineering research bulletins, many of which give the results of researches extending over many years, costing many thousands of dollars each.

Considerable of the research at existing engineering experiment stations at land-grant colleges is by members of the regular engineering instruction staffs, devoting part time to research, but more and more the preferable plan is prevailing of employing full time research staff members, or engineering staff members full time during part of the year.

*Group B*—Eleven land-grant colleges which apparently are ready to establish engineering experiment stations at once, without waiting for State or Federal legislation, provided the Association of Land-Grant Colleges takes a stand encouraging such a practice, are as follows: California, Michigan, Minnesota, Nebraska, Nevada, New York, North Carolina, Oregon, Rhode Island, South Dakota, and West Virginia.

*Group C*—Twenty land-grant colleges, as follows, favor organization of engineering experiment stations but do not see how to start now without special State or Federal appropriations: Alabama, Arkansas, Delaware, Connecticut, Florida, Georgia, Kentucky, Louisiana, Montana, New Hampshire, New Jersey, New Mexico, North Dakota, Oklahoma, South Carolina, Tennessee, Utah, Vermont, Virginia and Wyoming. In these cases the Association of Land-Grant Colleges should encourage such institutions to make a small beginning, even if only \$1,000 annually.

*Group D*—Three land-grant colleges which seem indifferent to engineering experiment stations are: Arizona, Idaho, and Mississippi. Probably the three institutions in this group will decide for Group C or B in the end.

## II. IMMEDIATE ORGANIZATION OF ENGINEERING EXPERIMENT STATIONS AT ALL LAND-GRANT COLLEGES

(1) Your committee strongly urges the immediate organization of engineering experiment stations at all land-grant colleges, believing this to be extremely desirable and entirely practicable without waiting for State or Federal legislation. Engineering research is absolutely necessary to the progress of the engineering profession, and is vital to engineering education.

(2) Every institution with resources sufficient to give engineering instruction worthy the name can surely spare at least a little for engineering research. The experiment station is the land-grant college type of organization of all research. Even if no more than \$1,000 annually can be spared for engineering research, it is best to organize an engineering experiment station, for such a station is the acorn from which a great tree may grow.

(3) Every land-grant college should organize an engineering experiment station on the same basis as its agricultural experiment station, namely, with a director and a station staff. If the sum available for research is small none should go for salaries of the staff at first.

(4) The needs of the engineering experiment station should be presented at each session of the State legislature along with the other college askings. Only in this manner can mechanic arts receive just treatment in comparison with agriculture.

## III. COORDINATION OF ENGINEERING EXPERIMENT STATIONS AT LAND-GRANT COLLEGES

Until some Federal aid to engineering experiment stations at land-grant colleges is voted by Congress, there can be no Federal coordination of such stations similar to that now exercised over agricultural experiment stations. This will be an advantage to the engineering stations provided they can coordinate voluntarily and effectively to reduce useless duplica-

tion and to work unitedly on engineering problems requiring research in more than one State.

(1) Coordination must be entirely voluntary.

(2) The Association of Land-Grant Colleges is the natural coordinating agency.

(3) A standing committee on engineering experiment stations is suggested as in accordance with precedent in the Association of Land-Grant Colleges.

(4) The membership of the standing committee should be appointed in the same manner as in the case of other standing committees, except that the secretary of the engineering section should be a member ex-officio.

(5) The standing committee should obtain, edit, and distribute quarterly reports from all the stations, showing research projects under way and progress thereon.

(6) A working conference of directors of engineering experiment stations should be arranged at each annual convention to report their plans for next year's work and to arrange for cooperative work.

(7) The standing committee should study and report to the separate stations plans for concerted research on engineering problems of national scope (such as highway research).

(8) The executive committee of the Association of Land-Grant Colleges should be authorized to finance the standing committee to a reasonable amount (determined by the Executive Committee) from the general funds of the association.

#### IV. ENGINEERING EXPERIMENT STATION RECOMMENDATIONS TO THE ASSOCIATION OF LAND-GRANT COLLEGES

Your committee therefore recommends that the engineering section request the Association of Land-Grant Colleges to adopt the following resolutions:

WHEREAS, engineering research is as vital to mechanic arts as agricultural research is to agriculture,

THEREFORE BE IT RESOLVED, (1) That the Association of Land-Grant Colleges urges each land-grant college to organize an engineering experiment station at once (unless this has already been done) without waiting for special State or Federal legislation, and to make an annual assignment of funds for engineering research.

(2) That the president of the association be instructed to appoint a standing Committee on Engineering Experiment Stations, of four members, of whom three shall serve three years each (the first three to be appointed for one, two and three-year terms, respectively) and the fourth shall be the secretary of the engineering section, ex-officio.

(3) That the standing Committee on Engineering Experiment Stations be authorized to act as an agency for the purely voluntary coordination of land-grant college engineering experiment stations, to collect and distribute progress reports of research and publications at the separate stations, to discourage undesirable duplication of work, and to promote concerted action on problems requiring research in more than one State.



RESOLVED, that the Executive Committee be authorized to finance the work of the Committee on Engineering Experiment Stations.

Very respectfully submitted,

ANSON MARSTON,

A. A. POTTER,

C. R. RICHARDS,

*Committee.*

The recommendations of this report were referred to the Executive Body. For action on them see p. 289.

WEDNESDAY AFTERNOON, OCTOBER 30, 1920

### ENGINEERING AND INDUSTRY

The discussion of this topic opened with the following paper by Hugo Diemer, La Salle Extension University, Chicago.

#### INDUSTRIAL RELATIONS AS THE SCIENCE OF HUMAN ENGINEERING THE POSSIBILITY OF THIS SCIENCE AS A REMEDY FOR INDUSTRIAL DISCONTENT, LABOR TURNOVER, AND SIMILAR FACTORS CONTRIBUTING TO THE COST OF PRODUCTION

BY HUGO DIEMER

It is a significant sign of the times that the subject assigned to the committee on mechanical engineering of the Society for Promotion of Engineering Education is, Production Engineering. The announcement of this subject as a main topic to be considered by that committee is an indication of the appreciation of the fact that the engineer in industry is expected to understand something more than designing and testing.

The things which a college graduate is expected to know along production engineering lines when called on to fill an executive position in industry, are:

What operations are required to make a given product?

What equipments and tools are necessary for these operations?

How long should an operation take?

What constitutes a typical equipment for a definite manufacturing program?

How far from assembly must the various components be started in order to secure uniform employment of equipment and men?

The executive engineer is expected to know these things, because they are vitally essential to the success of an industrial undertaking. But, there is another production and cost factor equally important to good designing and good production engineering, and that is, the human factor. This factor is of such importance that if properly handled it will overcome weakness in designing and in production engineering, but if improperly handled it will prevent business success, even with the finest designing, and the finest production engineering.

There is an accurate scientific method for measuring the direct value of good industrial relations and that is, labor turnover and its cost. Labor turnover may be defined as the ratio of the number of replacements of

workers to the average working force, although an equal number of industries prefer separations to replacements in figuring the ratio. The direct cost of replacements and training a new employee has been found by statistical reports from a number of large employers to vary from \$38 to \$75, with an average of \$50. But this immediate direct cost of replacement is not the only measure of the value of satisfactory industrial relations. The loss due to replacing an experienced employee by a new one is usually greater than the direct cost of replacement, because of the lessened production and breakage of the new man, so that it is generally conceded that for every employee lost and replaced it costs the average industry at least \$100.

In addition to the losses due to frequent replacement, however, it has been estimated that 50 percent of our manufacturing capacity is wasted, because of the ill will between employer and employee, and because there is a general lack of a healthy basis of cordial relationship between the management and its organization.

All of us will agree to the statement that the relations of men associated in any business undertakings should be congenial, and that they must have confidence in each other. We will also agree that in most organizations there is too much insincerity and double-crossing of one another by minor and major executives, and this condition is likely to prevail through the entire organization, for, "like master, like man." This working at cross purposes is but one symptom of poor executive leadership. To acquire better leadership demands a knowledge of applied psychology.

It requires not only intelligence with regard to the scientific data pertaining to human relations to make applied human engineering successful, but it requires the possession of character by those constituting the management as well as by the personnel administrator.

Managers are not unlike the public at large in being attracted by toys and commotion and the appearance of things rather than their substance. Let us not forget, therefore, no matter how versatile a man may be in scientific methods pertaining to industrial relations that after all character is the basis of all human actions, and is the most important individual factor in human relationship and in the demonstration of business affairs, but we need character plus intelligence.

A survey of the reasons given by employees leaving a number of industrial concerns indicates the following as the principal reasons, given by the clearance interviewers after a careful analysis of the statements of both the men and the foreman: (1) Pay unsatisfactory, (2) insufficient supervision, (3) unsatisfactory shop conditions, (4) lack of opportunity, (5) misplacement, (6) unsatisfactory hours of labor, (7) poor transportation facilities, (8) poor housing conditions, (9) restlessness, (10) incompetency, (11) insubordination and trouble making, (12) irregular work due to (a) poor planning and scheduling, or (b) lack of materials.

The most effective remedial steps or activities have been found to vary in different industries and different localities. A brief summary of these remedial steps or activities may be given as follows:

(1) Provide a wage basis which will take due recognition of the increase in the cost of living budget during the past seven years. The question may be asked whether with the now decreasing costs of food and clothing and some other commodities we should not make corresponding decreases in wages. I think that those industrial concerns that have

any regard for the real money value of industrial relations will base their reductions in pay on the same kind of investigations as preceded their increases in pay. The increases were usually made at intervals of six months or a year after a careful survey of living costs had been made. To lay off employees suddenly and without warning, in large numbers, for the purpose of "breaking the labor market," will only result in greater bitterness of hostility on the part of the employees and an increased tendency to loafing and soldiering on the job, not only by those retained, but also by those that are laid off, when they have been rehired. As an experienced "time study" man, I make the assertion that the best time study man in the world cannot counteract the intentional opposition of embittered employees.

(2) The provision of increased and proper housing facilities will in these transitional days be just as important as during the days of high production. The housing facilities are still needed. Now that a considerable quantity of labor is released from industry, chambers of commerce and all men interested in community affairs can do no better work than to encourage immediate resumption of building both by private individuals and by community housing corporations.

(3) The providing of proper transportation facilities for workers is an important factor. Most industries are served by trolleys and trains. In these overcrowding has been the rule, causing unnecessary fatigue and exposure of contagious diseases. The development of jitney-bus service as a supplementary means of transportation is frequently remedial. The routing and scheduling of such busses as well as cars, and trains can usually be much improved by utilizing data obtained by surveys.

(4) The providing of restaurants and cafeterias for employees affords not only an opportunity for social contact but also for the application of scientific food values with a balanced ration which is digestible and palatable. An ordinary restaurant cook is not capable of providing food of that sort. There are few industries employing over 100 people where the restaurant or cafeteria has not proven self-sustaining.

(5) Recreational activities along athletic or social lines tend to bring about better industrial relations. There are two things to be avoided in connection with these, however:

(a) Avoid professionalism or semi-professionalism. The promoter and the professional will always be wanting to make money and will oppose amateurism. Success in industrial relations depends on the maintenance of an amateur spirit.

(b) Avoid all semblance of class distinctions. We must not assume that organized athletic teams will counterbalance unfair dealings by the management; in fact, there is no better opportunity for discussing the management than that presented by the employees by getting together in some recreation. If, on these occasions, the members of the management assume all the pomp and dignity of army generals or princes appearing for a few moments at a dress parade, and the slipping away or holding themselves aloof from the rank and file, they will only widen the breach between themselves and their employees.

(6) Provision of medical, dental, and nursing facilities. It is only large industries of the "big business" type employing over 5,000 people, that, as a rule, find it advisable to employ their own staff of physicians,

dentists, and nurses. The smaller industry can readily cooperate with hospitals, visiting nurses' associations, and physicians and dentists in private practice, to render systematic service of this sort to their employees so that these services are furnished with a minimum of effort and expense to the employees.

(7) Educational activities. These usually include single-occupation "training on the job" for shop or office, apprentice courses adapted to the degree of previous education so that we have courses for the graduate of the grammar school, high school or college; classes in citizenship and Americanization; classes or conferences for foremen in which the foremen are trained in the organization and management methods of the company, as well as principles of industrial organization and leadership. The salesmen are usually called in for a certain amount of training at the home plant. The house organ or family newspaper of the industry is usually considered an educational activity and a potent factor in promoting proper industrial relations.

(8) Keeping in contact with the prospective labor market by keeping up personal acquaintanceship on the part of the personnel force; with various public and private schools; by occasional newspaper write-ups of the company's activities; by public exhibition of motion pictures showing the company's shops, its processes and products.

(9) The creating of confidence in employees. Nothing destroys confidence and arouses suspicion more than a spy or detective system. Even though the individual spy or detective may not become known to the employees, the fact that spies are reporting is bound to become known. The management, from the top down, should discourage duplicity and sharp dealings. Fair dealing requires a frank discussion with the men of an impending depression or shortage of work necessitating lay-offs or shorter hours. This likelihood can always be anticipated far enough in advance so that the men can be told about it in a kindly way. The ruthless laying off of men at the eleventh hour does untold damage.

(10) The substitution of democracy for autocracy. The old type of production driver who frankly acknowledges with pride that he has risen to the top by fighting his way up and by destroying his competitors through foul means when fair means did not succeed is passing away.

Among the orthodox older members of manufacturers' associations there is a great hatred for industrial democracy which is shared by certain younger members who think they occupy their positions, because by the grace of God, they are superior beings. There are also a few misinformed ones who think that American industrial democracy is to be a counterpart of the Russian dictatorship of the proletariat. The American worker demands representation, believing in representative government as the American type of democracy.

Having been a close friend of Frederick W. Taylor, I know that Mr. Taylor appreciated to the fullest extent, not only the shop knowledge of the working man in the ranks, but the value of his judgment. The working man's knowledge and his judgment form an important part of the art and science of the metal trades which Mr. Taylor himself collected largely from the workers. Hence I brand as unfair those critics of Dr. Taylor and scientific management who claim that "he puts all the brains and all

the knowledge with the management and all the work with the man in the ranks."

Employees' representation on committees and councils does not constitute management by the employees, but it does secure cooperation and confidence of the employees. The hard, relentless, driving aggressive type of shop executive is being succeeded by the alert, square-deal type, who leads through confidence instead of driving through fear. This is a manifestation of the American spirit of democracy as something in men's hearts controlling their actions.

(11) Employee participation as company stockholders. This is secured by offering facilities for purchase of common stock as well as preferred stock on the installment plan, as practiced by the U. S. Steel Corporation, by awarding of stock as a service bonus, as practiced by the J. B. Stetson Company, and by employee representation on the board of directors, as practiced by the Procter & Gamble Company. The purchase and ownership of stock by employees make them participate in any possible losses just the same as other stockholders, in that, if no dividends are declared, they fail to receive theirs, and if a stock assessment is called for, they have no rights beyond any other stockholders.

If we bear these facts in mind, the argument falls to the ground which states that any plans for employees' participation in profits do not provide for their participation in losses.

(12) Better production control and scheduling is needed in most industrial establishments. Employees lose confidence in the ability of a management under which material and orders are allowed to come hit or miss. It is proverbial that most shop work is either a feast or a famine. The men are either marking time or working over time. Production and schedule-control are becoming so well standardized that no company can afford to be without them.

(13) The wage and promotion system should afford efficiency reward. This means that efficiency records based on actual measurements and not on opinion, must be kept of employees.

(14) The service bonus. By service bonus we mean increased pay for the same designation of work when done by an employee who has served a longer time. It has been found that the service bonus acts as an incentive to hold employees, when an increased rate is given at the end of six months', one year's, two years', and five years' service.

(15) Group insurance is furnished by many corporations and is considered an important factor in contributing to better industrial relations. The cost of insurance on the group plan is decidedly less than when individually purchased. The most prevalent practice is to furnish group insurance as a service reward, although some employers make an outright gift of it, largely because of the physical and mental examination which goes with it.

I have outlined above some of the technical problems and methods of the science of human engineering which confront the personnel administrator in his daily routine. If he is a broadminded, sympathetic man he cannot help but think along broader lines which involve study of ethical, social, economic, and political problems affecting community life as a whole.

After all, is not our national destiny intimately dependent on the way in which we meet our responsibilities as human beings in our everyday

industrial and business life? The industrial worker, from the salaried engineer down to the laborer, must feel that his rights are acknowledged and observed in his own every-day life and contacts as well as on election day. The average salaried employee and wage-worker suffers a great deal more anguish from industrial injustice than he does from injustice due to crimes or torts prohibited by law. Is not, then, this problem of establishing in industry and business the same kind of democracy which our fathers established politically the biggest problem of our time? If we can solve this problem we can agree with the orator in saying:

"Behold a Republic increasing in population, in wealth, in strength and in influence, solving the problems of civilization and hastening the coming of a universal brotherhood!"

Discussion of the subject was continued by Dean D. S. Kimball, Cornell University, as follows:

#### INDUSTRIAL PROBLEMS AND ENGINEERING EDUCATION

BY D. S. KIMBALL

Some thousands of years ago, Plato remarked, that while every man resented criticism of his trade, or calling, by those not familiar with his art, every man, no matter what his experience might be, believed that he could speak as an oracle in all matters pertaining to government. Apparently human nature has not changed in this respect, and if Plato were alive today, he would, no doubt, add education to the list of subjects on which most men profess to be well informed, whether they be educated or not, and despite the fact that they may never have been numbered in the ranks of the educators. We receive a great deal of profound advice and much of it, I fear, comes from those who have little knowledge of the difficult problems involved in technical education.

We have all become somewhat accustomed to seeing the engineer called upon to perform new and strange duties, but few of us were prepared, I believe, to see an engineer called upon to undertake one of the greatest pieces of constructive economics ever attempted. I refer to the work of Mr. Hoover in the late war, for Mr. Hoover is by training and practical experience a mining engineer. Yet, this somewhat startling event is in full keeping with the trend of modern industry. Every day sees the duties and responsibilities of the engineer widened, and it is difficult to see where the end will be. The engineer from the first has had great difficulty in defining just what his field of activity is. This is necessarily so in any civilized community where the life of the people rests upon mechanical contrivances. Engineering, and mechanical engineering in particular, is an integral part of everyday life and necessarily assumes fresh aspects as the complexity of modern life increases. It will be increasingly difficult to set its limits and boundaries.

These matters have long been a cause for work and worry on the part of teachers in technical schools. The original conception of these institutions was to train men to design, build, and operate machinery within a narrowly defined field. Fifty years ago the term engineer conveyed a fairly distinct definition of activity; today it is almost meaningless.

The closely prescribed curriculum of the early day of engineering schools succeeded well in sending out men who in time made a place for themselves in the engineering field. But the men who passed through these schools were far from satisfied with the training they received. Their complaint, however, has not concerned the technical studies imposed upon them, but has embodied a demand for broader training in harmony with ever-changing industrial conditions. The need of instruction in the principles that underlie organization and management did not at first make itself manifest. But as industry has become a greater factor in our industrial life, there has been an increasing demand for technically trained men, who know something of the commercial and managerial side of industry. Statistics show that about 75 percent of the graduates of technical schools go into the commercial and managerial side of industry. The demand, therefore, for the inclusion in the content of the curriculum of technical schools of some instruction in the principles of industrial organization and management is perfectly logical and simply calls for the extension of the application of scientific methods in the classroom to that portion of the industrial field that, up to now, has been left to empiricism and experience.

The amount of instruction in the principles of industrial organization that it is possible or desirable to include in the curriculum of our technical schools is an entirely different matter. The tendency of the industrial manager is to demand from the colleges men who have been trained specially for that portion of the field in which the manager is interested. Every man views the technical school through the spectacles of his own experience. The things that seem most important in his business are the things that he thinks should be stressed by the colleges. Whenever he has a "happy thought" on education, he hies himself to the nearest college and advocates a special course of some kind, and like the men of Plato's day, he speaks as an oracle regarding things educational. Every technical school in the land is beset by urgent requests, in some cases amounting to a demand, that the course be modified and changed to suit some particular part of industry. The Federal Government has been most urgent that special courses in ordnance, aviation, and similar war-like activities, be given recognition; financiers and bankers wish to have their particular field more fully represented. A book recently issued bears the title "Financial Engineering." Lastly, has come a demand for courses in "human engineering" from those interested in uplift work and human relations, so that we may look forward confidently to seeing publications even on "religious engineering." Why not?

The tendency of the over-enthusiastic teacher is to answer these many and conflicting demands by organizing highly specialized courses of instruction that will prepare the student admirably for a definite and narrow portion of the industrial field, at the expense of a broad and solid scientific foundation for his life's work. As a consequence, there are now appearing in answer to these demands for technically trained men for managerial positions just such narrow and highly specialized courses of instruction as are suggested in the foregoing. We find elaborate shop organizations for teaching the details of scientific management, so-called, several varieties of special courses in administrative engineering, and some courses have already been established in human engineering, whatever that may be.

Now, without doubt, there are some places where special courses of

the kinds described are justifiable in the higher technical school, just as specialized trade schools are justifiable in the lower grades of education. But such special courses do not solve the general problem any more than does the trade school in its own field, and there are certain great objections to the highly specialized courses demanded by the industrial manager. First, it should not be forgotten that the primary reasons why the technical man has been found useful in managerial work are his knowledge of the fundamentals of engineering design and construction, and because of the trained mind that he brings to the consideration of problems of organization and management. The training of his mind may be accomplished with many kinds of studies, but without the background of engineering fundamentals, he is of little use in that part of the managerial field that is open to him. That is, aside from personal qualifications that are inherent and cannot be acquired, the technical graduate is good material simply because he is primarily an engineer by training.

The character of engineering fundamentals and the amount of time that should be spent upon each one is fairly well agreed upon by educators and engineers who have given this matter careful thought. In fact, the constant pressure for many years exerted by leaders in the industrial field in an effort to crowd more and more kinds of work into the college courses has reduced these fundamentals to a minimum in almost all colleges. In this connection also, it should be remembered that the time available for college work is limited. Young men should be through with their studies and out in the world not much later than the age of 23 or 24, and this automatically limits the college period to four or five years at the most, depending on the age at which the student enters college and the quality of his preparation for college work. It requires at least three years' work to teach the average boy the engineering fundamentals referred to, thus leaving one year in which to give him some practical applications of these fundamentals in some particular portion of industrial practice. With some variations, practically all of the higher grade technical schools have modelled their courses along these lines. Only those who have wrestled with this problem can have any conception of the demands from the industrial field for instruction in special lines of work and of the difficulties that stand in the way of acceding to these demands. This pressure, however, has been a useful one, for it has compelled educators to fall back more and more to the teaching of fundamentals and has compelled them to search carefully for the fundamentals that are of most service. It is not claimed, of course, that the content of these fundamentals, or the methods of presenting them, is at present all that is desired. There is much work still to be done along this line, more perhaps than some of us are aware. But at the most these fundamentals can only be concentrated and made more presentable. They cannot be eliminated, as some would have us do, and still have courses that will prepare men for serious engineering work.

The particular problem under discussion, therefore, reduces to the selection from the field of industrial organization and management, of an educational content that can be incorporated in a course of instruction, such as is suggested in the foregoing, which will give all students in the course some instructions in the fundamental principles of organization and management and provide further opportunity for those who wish to go as far as possible along these lines, without in any way weakening the scien-



tific and engineering foundation of the course. This content is not difficult to find. Thus, all engineers should receive instruction in the elementary principles of industrial organization, cost-finding, wage systems, time and motion study, and the general economics of manufacturing. As most technical schools are organized this should be given before the senior year, at least. In the senior year there should be an opportunity for the student to specialize as far along this line as is considered desirable in other lines, such as gas engine design, steam engine design, electrical engineering, etc. Space forbids a more detailed statement of such a plan, but actual experience has already shown that such a course will give a student a sound engineering foundation and a good grasp on the fundamentals of organization and management. It will not, however, develop specialists in this line of work, nor will it develop some of those peculiar personal qualities that are so often demanded by the industrial manager, who is looking for specialized managerial talent.

It is not claimed here that an engineering training is essential for all branches of industry. And there can be no doubt but that many of the proposed courses of instruction that contain little or no engineering work will be found very serviceable. Schools of commerce and administration have long been successful in training men for business and such courses of instruction modified by the introduction of a limited amount of pure and applied science should prove useful for a large number of men who are seeking a place in industrial management. Many of the proposed modifications of the engineering curriculum are of this general character. They are not courses in engineering at all, but are attempts to develop the engineering type of mind by using other educational methods, at the same time giving considerable attention to the practical aspects of industrial organization and management. If such a mental development can be so attained, it should be possible to develop lawyers on some other basis than is now employed, and doctors can no doubt be trained with much less study in the theory of medicine. The conditions are analogous and it is extremely doubtful if such experiments will be accompanied with marked success. The engineering mind, like the legal mind, is the result, other things being equal, of a definite kind of training either in school or in practice, and any weakening of the fundamentals will be reflected in the finished product. While, therefore, these modified courses, which really lie between the engineering curriculum and that of the school of commerce, will no doubt be found useful, the graduates of such courses should not be called engineers, and in general they should not be expected to have an engineering type of mind. And those who now so strongly advocate great modifications of the engineering courses along these lines would be the first to point out the weaknesses of such graduates, and clamor for some other modification of the curriculum.

Some time ago, a writer on this subject introduced his discussion with the query, "What is wrong with our technical schools?" He then proceeded to remark that "the industries have recognized for some time past that the men furnished by the college were not what they wanted but what they were compelled to put up with." To this the writer would respond by asking, what is wrong with the industrial manager? The greatest shortcoming of the industrial manager has been his failure to recognize the truth of the foregoing statements. He has failed, in general, to see

that should the college send him men specially prepared for his work that it would be at the expense of the vital things that make the embryo engineer valuable to him. He has failed to evaluate properly the limitations of educational processes. When the industrial manager is willing to permit the recently graduated doctor to remove his appendix, or when he is willing to hire a newly-graduated lawyer to break his late rich uncle's will, it will be high time to demand that graduates of technical schools shall have such specific training as will permit them to assume important managerial or engineering duties on the day they receive their diplomas. The industrial manager has failed often, also, to recognize the fact that if every change in the college, that is demanded by the industries, were put into effect, the course of study would very quickly become hopelessly chaotic, "all tops and no roots."

The industrial manager again has failed often to recognize that the most difficult of all educational problems is to find out what a boy is fitted for. If the college could be sure of the boy's capabilities, and if there could be any assurance that the requirements of the industrial field would be permanent, specialized instruction could be greatly extended. So long, however, as our knowledge of human beings remains as limited as it is at present, and so long as industrial conditions remain as kaleidoscopic as they are now, the college owes it to its students to see that their training is such that, should they find themselves out of a position, either because of inaptitude in one line, or because of changed industrial conditions, they will have an educational foundation broad enough to build upon anew. This means a fairly close adherence to fundamentals in college work and puts the burden of adapting and specializing the graduate to fit any particular line of work upon the shoulders of the industrial manager, where it rightly belongs. It should be said that many managers now fully recognize this principle as is shown by the special provision made by many industrial concerns for adapting college men to their specific requirements. It may be that closer cooperation between the colleges and industry may, in the future, render this problem less difficult. However, such cooperative efforts as have had any degree of success have succeeded largely because of local conditions and can in no way be considered as solutions of the general problem of vocational guidance.

Furthermore, these considerations are not the only ones to which the colleges must give heed. The primary object of the technical schools was to send out men who would be useful to the industries. Most of the technical colleges have not got far beyond this strictly utilitarian viewpoint and the demands of industry tend to keep this viewpoint constantly before them. Our national ideal, however, have changed greatly since technical colleges were first organized. A new industrial day has dawned in which profits, as such, are not the most important consideration, and industry is coming to be looked upon as a means of supporting human existence and not as a means of corporate profit. We have become more interested in men than in machines.

Industrial efficiency we must develop, but the fruits of this efficiency must be for all if we adhere to our present national ideals of democracy. An efficiency that benefits the employer and not the employees, or an efficiency that builds up the State at the expense of the individual is foreign to these ideals. If technical graduates are to take an active part in

Industrial management, and it seems assured that they will, the colleges will be remiss in their duty if they do not include in their courses of instruction such work as will give their students some idea of the modern views of the distribution of the fruits of industry. Here is an educational problem and an educational content to be formulated regarding which little is said in the criticism of the technical graduates, though it is one of the most important of educational problems. "Where there is no vision the people perish," said the prophet of old, and this is as true today as it was thousands of years ago. Efficient industrial managers we must have; but if the Republic is to endure, we also must have industrial managers whose vision will be great enough to look beyond the petty requirements often laid upon the technical school for the man who, while useful to his industry, can also do something to make industry more useful to all men.

For after all, ideals and not technical developments move the world. The recent remark of a great industrial leader that if he had his way he would put business men at the headships of our colleges and universities, shows a lamentable lack of knowledge of the principal purpose of such institutions. Technical and commercial efficiency we must have, and the problems of production must be solved. But it will avail us nothing if we cannot also solve the problem of human relations. Our business men and financiers cannot lay claim to much progress in solving this last problem. Yet it is the one great problem and one that requires not only industrial knowledge but high idealism and a love for humanity. It has been charged that the colleges and universities are too far removed from industry and the practical things of life. This may or may not be true, but it is to be sincerely hoped that there will always be in this land great institutions of learning, that are not dominated solely by industry or industrial ideas, where great teachers will have an opportunity to prepare men, not only for the industrial world that now exists, but will also be free to prepare them to build a better industrial world to come.

E. A. HIRCHCOCK, Ohio State University. Of the papers presented this morning I am more particularly interested in that relating to "Cooperation with the Industries." There is only one point I wish to bring out and that is, that in cooperating directly with the industries we must be very careful not to let this overshadow what we might call indirect cooperation, that is, that cooperation in research which has been going along for a great many years and has resulted in immense benefits to the country.

In a recent address, Mr. Kettering, president of the General Motors Research Corporation, spoke of the very great importance of research work in connection with the fuel problem. In 1895 the late Professor N. W. Lord of our university was doing a great deal of investigation work on fuels of Ohio. His work resulted in extensive research in the same field by the United States Geological Survey, they establishing a station at the St. Louis Exposition in 1904. This line of research has not stopped at Ohio State University but is being pushed in other directions. For example, our department of metallurgy under Professor D. J. Demarest is now erecting a gas retort of one ton capacity, by means of which he will determine how Ohio coals can be used in making gas, and will also determine the ammonia, tar, benzol, coke, and other by-products. He

will also be able to determine the improvement, if any, by the mixture of different coals, and the mixture of Ohio coals with those in neighboring States. I have estimated that as a result of this indirect cooperation in this particular field, there is now an annual saving to the country of between 250 and 300 million dollars.

Another case of valuable indirect cooperation may be mentioned. The Ohio assembly in 1894 passed an act establishing at Ohio State University a department of ceramic engineering. The bill, to some in the legislature, was rather amusing, for they spoke of it as the "Mud Pie Bill," and somehow, there was inserted in that bill, along with other branches to be taught, that of making "mud pies." The introduction and passage of this bill was all due to the aggressiveness and initiative of Professor Edward Orton. As a result of the establishment of this first ceramic station, followed by others, work in that field has been of inestimable value in the engineering field.

We should be careful not to permit direct cooperation to be entered into to such an extent as to interfere in any way with indirect cooperation. I believe that this character of research is of much greater interest to instructors and investigators because it gives them larger opportunities to exercise their judgment and initiative, and that means very much in the production of results.

As a result of 18 years' experience in the educational and experimental field and of seven years in the industrial field, I am now trying to look at this matter from the viewpoint of both the educational institution and the industry. As to direct cooperation with the industries, I would say that probably one reason why the industries have not cooperated to a greater extent with the universities and have not sought their assistance is a selfish one. They probably take the position that they are not interested in investigation work, the results of which might get into the hands of their competitors. Then again, they may feel that there is the danger that research work might show up certain facts regarding their products which might become public and really do not substantiate fully some claims which they may have made in selling their product.

One way of obtaining cooperation with industries, is to have them suggest subjects for theses for our engineering students. The company with which I was associated during the past year employed quite a number of junior mechanical engineers during the summer. I am now advised that many of these juniors are asking this company for subjects for theses and soliciting the loan of equipment or apparatus with which to carry on the work. We know that in the past many theses, involving considerable work and expenditure of money, have been of no practical commercial value, and, therefore, thesis work taken up in this way would invite direct cooperation and be of value to the industries concerned.

CALVIN H. CROUCH, New Hampshire College of Agriculture and Mechanic Arts. I will relate a personal experience which will help to emphasize the statement made by Mr. Diemer relative to the importance of the good-will of the employees. I do not think he overestimated its importance.

I recall some early experiences in an engine works, where the notice on the main entrance door read as follows: "To avoid being

put out, keep out." That notice signified antagonism and was symbolic of the attitude of the men toward the company. The men would loaf and take advantage of the company whenever the opportunity presented itself. The relations were anything but cordial.

In contrast with the experiences in that shop, I recall my experience in the Baldwin Locomotive Works. At that plant the feeling toward the superintendent was that of admiration and affection. The relations were most cordial, as far as I could judge. I have never seen a shop in which there was a better spirit, or one in which the men worked harder or more conscientiously. I have always attributed it to the cordial relations and the feeling on the part of the men that they could count upon receiving a square deal if a controversy should arise.

#### REHABILITATION OF SOLDIERS

BY UEL W. LAMKIN

The idea of vocational rehabilitation to overcome the handicap of a man disabled in war is new in the world. The payment of a sum of money as compensation for physical disabilities is a well established plan. While all agree that the first obligation of the country is to restore the men to physical health, if possible, the next best thing that can be done for them is to restore their earning power, and the third benefit which should be given is payment of money.

To restore the men to a status of producers is a matter of simple justice to the men and of sound economy to society. If it is true that a trained man is worth more to society than the unskilled man, then vocational training is justified.

In determining the training courses which are given to disabled men, five elements are taken into consideration by the Board: First, the man's previous education, which varies from illiteracy to graduation from a college; second, the man's previous industrial experience, which varies from that of a day laborer to that of a man highly skilled in the professions; third, the man's disability, which ranges from the very slight in that which totally disables; fourth, the man's preference; and fifth, the opportunity for later employment.

It must be borne in mind that all of this training which is being given must lead to employment. The government cannot measure the success of the training given except in terms of employment. The job objective must always be kept in mind.

It is remarkable the number of colleges which have modified their prescribed courses of study to accommodate these men. It is not less remarkable that the men have adjusted themselves to the college environment. The number of men who have failed to make good in their training is remarkably small. The inconvenience which has been caused to the colleges has been everywhere well worth the experiment.

The cooperation of all colleges of the country is sought by the Federal Board for Vocational Education in behalf of the men themselves, in order that they may receive the best training that can be given in established institutions and that the board be not required to maintain separate schools.

The attitude of the men themselves after they leave the college and the feeling which they will have for the school which trained them will more

than compensate any school which temporarily inconveniences its faculty by modification of its curriculum to meet the needs of this class of men whose experience may properly be said to more than make up for a lack of scholastic preparation.

The following paper was presented by L. S. Hawkins, Federal Board for Vocational Education:

#### THE SMITH-HUGHES ACT AND INDUSTRIAL EDUCATION

By L. S. HAWKINS

The Federal Vocational Education (Smith-Hughes) Act, approved by the President February 23, 1917, sets up a cooperative relationship between the Federal Government and the States for the promotion of vocational education.

The appropriations concerning industrial education are for two purposes:

(1) An appropriation for the payment of salaries of teachers in industrial schools and classes. This appropriation in 1917 was \$500,000, increasing yearly by \$250,000 until in 1925, and annually thereafter, it is \$3,000,000. This appropriation is allotted annually to the States in the proportion which their urban population bears to the total urban population of the United States. A minimum of \$5,000 annually is guaranteed to each State. This money may be used only for payment of salaries of teachers.

(2) An appropriation for the training of teachers of agriculture, trades and industries, and home economics. This appropriation for the current fiscal year, and each year thereafter, is \$1,000,000. It is allotted annually to the States in the proportion which their total population bears to the total population of the United States. A minimum of \$10,000 annually is guaranteed to each State. This money may be used for the maintenance of teacher training.

All moneys allotted to the States under this act may be used only on condition that at least an equal amount of State or local money, or both, is expended for the same purpose. All schools or classes for which this money is to be used must be under public supervision and control.

The cooperative relationship set up by this act between the Federal Government and the States, is carried into effect on the part of the Federal Government by the Federal Board for Vocational Education, and on the part of each State by a State board for vocational education.

The moneys allotted to the States are sent when the State, through its State board, submits a plan under which the moneys are to be expended, and said plan has been approved by the Federal board. In effect, then, the work carried on under the provisions of the act must be done in accordance with the provisions of the act itself and with the provisions of the plan or contract agreed upon by the Federal board, representing the Federal Government, and the State board, representing the State Government. The State board may then carry on the work directly or in turn cooperate with other State or local agencies.

In case the State board does cooperate with other agencies within the State the Federal Government deals only with the State board con-

cerning this work. For instance, the State board for vocational education may enter into an agreement with the State agricultural college for the training of teachers of agriculture in accordance with the plan agreed upon between the State board and the Federal board. The work of the State college then becomes that of a sub-contractor under the general contract between the State and the Federal boards. The Federal board deals only with the State through the State board for vocational education.

The appropriations for the payment of salaries of teachers in industrial schools and classes may be used for the support of education of less than college grade for those who are preparing to enter upon employment or those who have already entered upon employment.

Three types of schools are provided for in this portion of the act:

(1) The all-day school which, in cities of over 25,000 population, must be in session for not less than six hours per day, nine months per year. There are certain modifications for cities under 25,000. One-half of the school day must be given to shop work on a useful and productive basis. The remaining half of the school day may be divided between related subjects and general education subjects. The instruction must be designed for pupils over 14 years of age who are preparing to enter upon a given trade or industrial pursuit.

(2) The part-time school, which is intended for those who have entered upon employment and are over 14 years of age. These schools and classes must be operated for a period of not less than 144 hours per year. The instruction must be given during regular hours of employment. Classes may be carried on at the school, in the shop, in classrooms adjoining the shop, in a building near the shop, or elsewhere. The instruction may be either in manipulative processes or related to those processes, or both.

(3) Evening schools and classes, which are open only to persons over 16 years of age. The instruction must be supplemental to the day employment. These schools and classes are for persons who are employed during the day and the instruction is given outside of the regular hours of employment. These classes are strictly trade extension classes.

From the appropriations for teacher-training not more than 60 percent nor less than 20 percent may be used for the training of teachers of trade and industrial subjects. The instruction in these classes may be given only to persons who have had adequate vocational experience or contact in the line of work for which they are preparing themselves as teachers or who are acquiring such experience or contact as a part of their training, and the State board, with the approval of the Federal board, must establish minimum requirements for such experience.

There are two points in connection with this law which I would like to call specifically to the attention of those who are connected with the engineering colleges:

(1) Few, if any, of the States have done as much in the way of trade extension work for people employed in trade and industrial pursuits as has been done for those employed in agricultural pursuits. In other words, few of the States have done as much in the way of trade extension instruction as they have done in the way of agricultural extension instruction. While many of the cities and larger towns can and do organize instruction centers for persons employed in the trades, there are many of the smaller communities which have not and possibly cannot organize such instruction

centers. I am of the opinion that there is a great field for some State agency to offer instruction of less than college grade along lines supplementary to the daily employment of those who are engaged in trade and industrial pursuits.

In this connection, however, I should like to point out that this is quite a different problem dealing with quite a different type of instruction from that of the engineering courses in the colleges. It requires a quite different type of instruction. It is not a problem of engineering education, but is a problem of trade and industrial education of less than college grade.

I know of no better agency to address itself to this task than that of the engineering college, and I am inclined to think that, particularly in the States which are more sparsely settled, it would be possible for the engineering college in cooperation with the State board for vocational education to set up an instruction service of the trade extension type, which would do for the smaller communities what many of the larger communities can and are doing through their own local school organizations.

(2) The various types of schools organized under the provisions of the Vocational Education Act are dealing primarily with those who are preparing to enter the productive side of the trade and industrial field, and I use here the term "productive" in contrast with the planning and managerial side of the field.

In order to provide adequate instruction it is absolutely necessary that the teachers themselves be skilled in the trade or trades to be taught. It is absolutely impossible to get men with adequate trade experience to give up their trade for four, three, two, or even one year, and attend an institution in order to be trained for the teaching profession. This means that the professional instruction for preparing teachers must be taken to those who are engaged in the trades and at a time when they are engaged in the trades. In other words, the institution which is to train teachers of trade and industrial subjects must look at the job as being one of taking the instruction to the men through evening courses, while they are engaged at their trades during the day, or are already entered upon the job of teaching, rather than trying to induce these men to quit their jobs and come to the institution to receive such instruction.

With the high wages being paid to men employed in industrial pursuits it is difficult to secure and retain the services of highly skilled men and women for the teaching profession. This is especially true since it has been found that the instruction given in teacher-training courses often enables trained workers to secure a more advantageous position in industry itself. This situation makes all the more necessary an extended program for instructor training. The States are beginning to recognize the fact that it is impossible to induce any great number of trained mechanics to give up a job which is already paying as much or more in the way of wages than is being paid to the teachers in the public school system, and go to the institution for training with the prospect at the end of the period of training of securing a teaching position which will pay him the same or even a little less wage than he was receiving before going to the institution. This means taking the teacher-training work to the men rather than attempting to bring the men to the teacher-training institution.

It seems to me that there is a splendid opportunity for service now



open to the engineering colleges if they will consider this as a separate and distinct problem from that of training students at the institution for engineering positions.

J. D. PHILLIPS, University of Wisconsin. When the University of Wisconsin first entered into an agreement with the Government to train disabled soldiers, we decided to accept all students approved by the Federal Board for Vocational Education who had completed the equivalent of an eighth-grade education. In a few exceptional cases students with less than a common school education were admitted. The admission of students with such limited preparation made it necessary to arrange for a number of sub-collegiate courses. These courses were of two kinds:

(1) Courses intended to improve the student's general education. This group of courses included courses in vocational English and vocational mathematics.

(2) Elementary technical courses. Farm accounting and auto mechanics are examples of this type of course.

We had no difficulty in arranging for classes in sub-collegiate courses of the first kind, since a sufficient number of students were in need of such elementary work. We found it very difficult to arrange to give instruction in the elementary technical subjects for two reasons: (1) The number of students who were in need of any one of the elementary technical subjects was usually so small that the cost per student for instruction was abnormally high; (2) even in those courses in which a sufficient number of students were registered to justify us in forming a class, it was in many cases very difficult, and in some cases, impossible, to secure a competent instructor to conduct the work.

It soon became evident that we would have to do one of two things: (1) Arrange to specialize in certain elementary technical work in order to insure a sufficient number of students to form classes, or, (2) discontinue the instruction in elementary technical subjects.

At a conference held in Chicago, during the past summer, it was suggested that perhaps it would be better to have one or two Middle West institutions organize for the instruction of Federal board students whose preparation had not gone beyond the eighth grade. The attention of the officials of the district board who attended the above conference was called to the fact that at Wisconsin we found it necessary to provide for the training of State bonus students. After some discussion it was agreed that beginning this fall it would be the policy to send to the University of Wisconsin only students with two years or more of high school preparation. It was understood that in very exceptional cases students with one year of high school preparation would be admitted to our regular four-year courses. It was agreed that students planning to take short courses in agriculture would be admitted with the usual preparation, namely, an eighth-grade education. In accordance with the arrangement made at the above conference, students were admitted this fall as regular or special students; a regular student being defined as one who has satisfied the requirements for admission to a regular four-year course, and a special student being one who has not satisfied the admission requirements to any one of the courses offered by the university.

Last year we had Federal board students registered in all colleges of

the university, the total being about 200. Approximately the same number of Federal board students are registered in the university this fall. The total number of Federal board students registered in engineering courses to date is 47, made up of 26 regular students and 21 special students.

The number of students registered in each of the regular four-year courses is as follows:

Electrical engineering.....	6
Chemical engineering.....	2
Mechanical engineering.....	2
Civil engineering.....	6
Mining engineering.....	1
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Total.....	17

The above includes only the regular students who were registered last year and are continuing their courses this year. The new students have not thus far been classified by courses.

The special students are registered as follows:

Highway construction.....	1
Civil engineering.....	2
Machine shop work.....	1
Surveying.....	1
Mechanical drawing.....	3
Electrical engineering.....	2
Pattern drafting.....	1
Gas engineering.....	1
Gas engine design.....	1
Gas production.....	1
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Total.....	14

The above includes only the students who were registered last year and returned this year. It does not include new special students. In this connection, it should be stated that the plans for special technical work that we made for students in attendance last year will be carried out for the same students who returned this year.

Special methods of instruction have been found necessary in carrying on the work with Federal board students. These students require a large amount of individual attention. While the physical condition of most of them is such as to justify the Federal board in placing them in training, they are not, as a group, normal individuals by any means. The board has appointed a coordinator to look after the interests of these students, and the university has appointed a counselor who has general supervision of the work, and who, with other officers of the university, determines what policy should be adopted in caring for the needs of these students.

In addition to special courses planned to meet the needs of this group, it has been found necessary to supplement the class instruction in regular university courses by special instruction to individuals or groups taking such courses. For example, in certain regular university courses an arrangement for an additional class period each week is made in order that Federal board students may be assisted in getting their work. An individual tutor is provided whenever it is found necessary.

If the physical and mental condition of the Federal board students is taken into consideration, it may be said that the results secured by these students have been very satisfactory. As a rule poor results have been accounted for by poor health. Approximately two-thirds of the Federal board students in the engineering college last year, secured grades that would entitle them to be classed as "Good" to "Excellent" students. We have had no discipline cases. They are as a rule an earnest group of men. Many of them are easily discouraged and have to be frequently encouraged to remain in school. Thus far two of our men have been assigned to placement training, and while we have not been informed officially that they are giving satisfactory service, we have been told that their training at the university has aided them in performing their duties and has opened up for them possibilities for advancement.

W. N. GLADSON, University of Arkansas. My discussion of this question will be confined to a description of our experiences with a small number of men during the past 18 months. Our results and observations may not be considered as typical, because the number of men involved is small, and the time of observation of results short.

The first Federal student came to the University of Arkansas in April, 1919. Since that time we have enrolled a total of 101 men. Fifteen of these students were registered for regular university courses, the remainder were in special courses, largely vocational. The largest number in attendance during any one month was 68, and the smallest attendance during a like period was 44. Our present enrollment is 55. We have given instruction (aside from the regular engineering courses) in automobile mechanics, telephone engineering, architectural and mechanical drawing, general electricity, stationary steam engineering, and power plant engineering; but we are now confining our special instruction to two classes of work: (1) A course of training for general electricians, and (2) a course for power plant engineers or operators.

This concentration on two courses of study was found advisable because of the small number of students in some classes and the difficulty of securing instructors, with the exception of the course in automobile mechanics. In this subject the large amount of extra equipment that was necessary to give proper instruction, together with the fact that another college in the same district was much better equipped and was concentrating its efforts for Federal students on this subject, led us to transfer our automobile students and abandon the course.

Thus far, 7 men have completed their work satisfactorily, 16 have been transferred to other schools, 13 have been sent to placement training, 6 withdrew because of sickness, and 4 were discharged because of inability or unwillingness to make satisfactory progress in their studies, leaving 55 at present enrolled.

We found great difficulty at the beginning of this work in arousing the interest and holding the attention of many of the students. Some were still suffering from wounds or were extremely nervous, and attendance on classes was very irregular. Some students came because the Federal board sent them and paid them for coming. A few brought objectionable habits, supposedly acquired in the army. Such cases were exceptional, however; in the main, we found the greatest obstacle in the way of progress of these

men to be lack of early training and the ability to apply themselves. Many of the men we received for vocational work had never had the advantages of a common school education; we, therefore, had to receive them in the same classes with men whose education extended to the primary grades, and men who had completed grammar school or a year or two of high school. One man who came to us in the spring of 1919 could scarcely write his own name and had never attended grammar school. Notwithstanding his educational handicap, this man has proven one of the best Federal students it has been our pleasure to instruct. He began at the very foundation, and patiently applied himself to the task of learning the old-fashioned education—reading, writing, arithmetic, and spelling. He is still with us, striving to qualify himself for a position as a power plant engineer. He can now write a legible and very creditable laboratory report; he is on the job all the time and always busy; and, in my opinion, will be a valuable station operator when he has finished his training. It is such men as this who prove the wisdom of the Government's policy in offering training to disabled soldiers.

We have found great difficulty in securing teachers with the necessary temperament and breadth of training required for successfully instructing this class of students. In my opinion, it is much easier to find an instructor qualified to teach college students higher mathematics and advanced engineering theory. This difficulty is increased by the fact that our contract with the Federal Board for Vocational Education is an annual one and instructors must be employed for a like period, without holding out the hope of permanent tenure of office on the university staff.

It is too early in this work to predict final results with any degree of certainty, but I will venture to say that the large number of wounded soldiers who will finally be prepared for useful vocational service through the efforts of the Federal Board for Vocational Education will fully justify the Government's policy.

The following paper was presented by Dean G. W. Bissell, Michigan Agricultural College:

#### ACADEMIC CREDIT FOR R. O. T. C. ADVANCED COURSES

BY G. W. BISSELL

Prior to 1917, three years, three hours per week, had been the military requirements at the Michigan Agricultural College for all physically fit male students, except certain athletes, and those excused, except athletes, were required to earn one and a half credits per term of exemption. Seniors who elected drill and served as cadet officers received five credits, applied as elective by agricultural students, and used by substitution for required work by the engineers.

Subsequent to 1917, when the R. O. T. C. was established as per G. O. 49, juniors and seniors were allowed five credits per year for the advance work, but this basis was not tested until this fall, when, for the first time upperclassmen are, under War Department regulations, eligible for the advanced courses. At this time it was found that neither the professor of military science nor the students were satisfied with the credit allowed, and requested three credits per term, or nine per year, or 18 for the course.

With 16 officers and men and a large amount of equipment for these special units on hand and ready to function, we were practically faced with the alternative of granting the credits asked, or seeming to fail to cooperate with the War Department in its effort to build up a corps of reserve officers. We granted the credits and the courses are in operation.

The granting of these credits to our engineering students involved logically making them usable—a problem which has been met, experimentally at least.

Recent catalogs of 22 land-grant institutions show that 6 allow 3 continuous credit hours, 7 allow 2 continuous credit hours, 1 allows 1 continuous credit hour, 8 allow no continuous credit hours for R. O. T. C. advanced courses. It would seem, therefore, that the problem of credit for R. O. T. C. advanced courses is not solved. I am aware that the conference of March 1-2, recommended that "college credit for R. O. T. C. courses" be "left to the institution," but I believe that the situation is not satisfactory. What shall we do about it?

THURSDAY MORNING, OCTOBER 21, 1920

The first paper at this session was by Dean A. A. Potter, Purdue University, as follows:

#### ADMINISTRATION OF ENGINEERING DIVISIONS AT LAND-GRANT INSTITUTIONS

BY A. A. POTTER

In every educational institution some system of organization should be used which fixes and coordinates definitely the authority and duties of every person. Some claim that the duties of college teachers and executives are dependent upon many indeterminate factors, making supervision undesirable. A strictly scientific system may not be applicable, but every college division, and especially an engineering division, should be administered so that responsibility can be fixed where it belongs. It is true that the average teacher may be more intelligent than the average employee of a manufacturing establishment, but there is no reason why he should be the only judge of his own efficiency and conduct.

To avoid misunderstanding the duties of every person connected with the administration, instruction, and research activities of an institution, should be carefully worked out. It is desirable to have organization charts which show lines of authority and of responsibility.

The president is the chief executive of the institution and the direct representative of the governing board. He appoints the deans and heads of the various departments in the various divisions of the college. He also approves and transmits to the board recommendations from deans and heads of departments regarding subordinate officers.

The president coordinates the work of the various divisions and is the determining factor in apportioning the funds of the institution among the various divisions and projects. He approves the recommendations of deans regarding the subdivision of funds among the several departments in a division.

The president determines the general policies of an institution and is

the final authority regarding changes in the courses of study, fields to be covered by teaching and research departments, and student discipline.

The dean of engineering should be responsible for the conduct of the engineering division, or college, to the president. The position of the dean of engineering should be similar to that of a manager who reports directly to the president of an industrial concern, and whose main duty it is to unite and coordinate the work of the several departments under him.

The administrative duties of the dean of engineering should also include the following: Preparation of the engineering budget from the recommendations of the heads of departments; recommendations to the president and governing board regarding heads of departments; approval of recommendations from heads of departments regarding officers of subordinate rank; responsibility for distribution of funds between the various engineering departments; approval of all expensive purchases; responsibility for research and extension activities in engineering. All official communications to the president should pass through the dean's hands.

In institutions having engineering experiment stations, the dean should be the director of the engineering experiment station, and with the heads of the various departments, should initiate research problems of value to the profession, to the industry, and to the State. The same applies to engineering extension.

The dean is the presiding officer of the engineering faculty, which should consist not only of the professors and instructors imparting instruction in engineering subjects, but also of representatives of all departments giving instruction to engineering students.

The engineering divisional faculty initiates changes in the engineering courses of study, and passes upon questions affecting this division or college only.

The dean, with the heads of the various departments, approve the subject matter of the various courses offered to engineering students, as well as text-books and methods of presentation.

The dean, besides his administrative duties, should act as advisor to the engineering students, as well as to the teachers, in the engineering departments under his direction. He should have the capacity of enthusing teachers and students in their work.

It is always desirable that the dean of engineering should possess knowledge of the principles of organization and management and should have served successfully in various capacities as a teacher and engineer. He should teach several hours per week fundamental subjects along his specialty, but should not be handicapped by being required to attend to too many details.

The dean, like the successful manager of a factory, must be a close student of men, not easily discouraged, sympathetic, tactful, resourceful, energetic, and enthusiastic.

The head of a department in an engineering college or division should have practical as well as teaching experience. He should be tactful and must see that every teacher under him uses his time to the best advantage. He must impress upon the teachers under him their responsibilities to the college and to the students. Departmental meetings should be held at regular and frequent intervals and the department head should encourage

his subordinates in developing correct habits and should enthuse them to carry on advanced research and study along the lines of their specialty.

The personality, ability, education, and experience of the teacher have more to do with the success of any educational institution than all other factors combined. A good teacher should have a thorough knowledge of his subject, should be familiar with the best teaching methods, should understand human nature, and should be able to interest and to enthuse his students in the subject he is teaching, while stimulating each man's imagination and developing the student's initiative.

At the 1912 meeting of the Society for the Promotion of Engineering Education, Professor H. W. Hibbard of Missouri stated that he had listed 209 different activities for a professor. Institutions should not allow professors and instructors to divide their energy among too many activities. Every encouragement should be given a professor to develop in his profession, and in no case should a professor become a stenographer, hectographer, bookkeeper, purchasing agent, and repair man.

It is very common to find professors and instructors spending many valuable hours in putting engines and apparatus in shape for laboratory use. This should be discouraged and mechanics with more mechanical skill and at lower salaries should attend to such details. This also applies to clerical and stenographic help, but care must be taken that the teachers do not waste valuable time developing administrative details to keep a large office force busy.

Engineering teachers should be encouraged to identify themselves with State and national societies and to prepare papers and manuscripts along engineering lines. A limited amount of outside practical engineering work may be desirable, if the problems are of an unusual character, as this will prove very beneficial to an engineering teacher of any grade. All routine engineering work should be discouraged during the academic year and all outside activities should be carefully supervised. If engineering teachers are not overburdened with teaching, they should be encouraged to devote their spare time to research and to public service by solving, with the aid of their students, problems of value to their community, State, or Nation.

Engineering teachers should devote their summer vacations in actual practical engineering work or in advanced study. It is only by such means and by an occasional year's leave that an engineering teacher can keep up with the developments in his profession. Sabbatical years on part pay should become more common in land-grant institutions.

In colleges of small and medium size it may be desirable to have the dean and heads of engineering departments responsible for the physical plant of the institution, including power and heating plants, building construction, and repairs, etc. In most institutions the dean and heads of the division of engineering should only act in a consulting capacity in such matters. Actual contact with the problems confronting the physical plant of a large institution should prove of practical value to teachers of engineering.

It is questionable as to the desirability of requiring engineering teachers to devote much time to extension work. A little of this activity applied to the industries of the States may prove useful, but such work should not be allowed to interfere with teaching and research. For best

results separate staffs should be maintained for engineering experimentation and for engineering research, but under the direction of the dean of engineering and closely interwoven with the teaching departments.

G. W. BISSELL, Michigan Agricultural College. Many times during 30 and more years of contact with engineering educational work in land-grant institutions, I have said to myself, and sometimes to others, that if I could construct a college or university from the ground up, I would do thus and so. In the present instance, "if I were King," I would organize on lines somewhat different from those marked out by Dean Potter in his excellent paper. In order to convey my idea to you I must include the whole institution in my survey of the question of administration.

I suggest the following statement of the construction or functions, or both, of the several units which make up the administration of a college or university of moderate size and facilities for maintaining adequate administrative machinery.

(1) *The governing board* should request the faculty to elect a small number of its members, other than the deans, to attend meetings of the board, and they should have the privilege of discussion. Also, the president of the student council, or other student representative, should be given a seat and the privilege of discussion.

(2) *The president*, as is usual, should attend board meetings and be the prime mover therein, etc., but not necessarily the presiding officer of the faculty.

(3) *A committee of deans* to act as advisors of the president in his duties to the board and to the faculty and students. The president of the student council, or other representative of the student body, should meet with this committee and take part in its deliberations.

(4) *The general faculty* to function mainly as usual but to include in its gatherings and deliberations representatives of the teachers not members thereof and one or more representatives of the student body.

(5) *Standing committees* and sometimes special committees of the faculty to be elected by ballot for definite terms, instead of being appointed by the chair, and the personnel of these committees should be changed by the retirement of one member each year or at other stated interval.

(6) *The dean of each division* should have—

(7) *An advisory board*, or council, consisting of the heads of the departments in his division and a representative of the student body of his division.

(8) *Divisional faculties* should include student representation, might have elective chairmen, and its standing committees should be chosen by ballot and have rotational membership.

(9) *A forum* of the entire teaching and administrative staff is useful at occasional intervals.

(10) *Inter-divisional faculty representation* should be a feature of divisional faculties.

(11) *Publicity*. The institution should issue a periodical bulletin, to include minutes of all administrative bodies, which should be distributed to all participants therein.

The suggestions are not inconsistent with the outline proposed by the author of the paper, but changes its spirit. In so far as they might be



adopted their effect would be to unify the whole institution, by giving to all elements opportunity to understand and appreciate what is going on and by preventing hasty or unconsidered action at points along the line, and by increasing the sense of responsibility of all concerned, and their interest in matters pertinent to the internal welfare of the institution.

Much is being said and written nowadays about humanizing industry. Why not humanize institutional organization and administration?

J. C. NAGLE, Texas Agricultural and Mechanical College. Dean Potter has covered the field of administrative duties, especially those of the dean of engineering, so thoroughly in a general way that there appears to be little room left for discussion. The size of the institution, and the importance of engineering work therein, as related to activities in other lines of education and research, will necessarily affect the details of the organization. The president is, and should be, the central and governing force in the administration of the work of the institution as a whole, but as an institution grows in numbers and its lines of activity are extended, much of the work which the president of a small institution does must be delegated to others, and the president's time and energies should be devoted to the larger and more general administrative features.

By subdividing the activities of the institution into schools or divisions those subjects which are related to one another are usually placed in charge of deans or directors through whom the work of the several departments of each school or division is connected with the office of the president. In technical schools and divisions the duties of the dean or director are more varied and complex than in some others where academic, professional and business interests are not so intermingled. The dean of engineering should be qualified for all of the duties which Dean Potter has mentioned, and "then some," to use a slang expression. If, as is generally the case in land-grant institutions, State legislatures have to be periodically convinced that the budgets of the institutions are not thinly veiled attempts at high-handed robbery, the deans of the technical schools and the directors of experiment stations and extension services should be advised of the general plans of the president and should assist in presenting not only the needs but the evidences of usefulness of every branch of the institution's activities. The budgets for the several schools and divisions should be presented to the president after having been carefully threshed out, adjusted, and correlated by their deans, working in conference with the several heads of the departments of their schools, and afterwards these several budgets should be harmonized and adjusted by the president, working in conference with his deans and directors. The necessity of each major item of the budget for each school or division should be understood not only by the president but by the heads of other divisions or schools and each one should be prepared to assist the president in presenting all the needs of the institution to such authorities as are charged with the duty of making appropriations from the State's funds.

Just as the president should utilize his deans as advisors in all matters of large importance to the institution, so should the dean of engineering, or of any other school for that matter, avail himself of the counsel of the heads of the departments of his school. These department heads should have regular conferences with the members of their departmental staffs,

each of whom should feel that his opinion will receive due consideration when presented. These departmental conferences may well be held once each week, and those of the department heads and the dean at longer intervals, and as occasion may demand. Periodical meetings of all teachers of engineering students, in the general as well as the technical subjects, should be called by the dean of engineering, who should conduct the meetings. He should also, as occasion may require, issue calls for assemblies of engineering students, and should encourage them in the work of their technical organizations. He should be careful, however, not to interfere with the conduct of the students' meetings unduly, lest he destroy initiative and interest on the student's part.

As Dean Potter says, the dean of engineering should be a teacher, practicing engineer, and business manager, all at the same time. He should not be so overloaded with clerical details of administration that he has no time for meeting the public or for study, but, unfortunately, this very condition does exist more often than not. I question whether, in the larger institutions having well-developed engineering experiment stations, the dean of engineering should also be director of the station, though unquestionably he should be a member of the advisory board of the station. In most of our land-grant institutions the dean of engineering has been also head of a department, at least in the earlier stages of the growth of the institution, but there comes a time when it is desirable to separate him from his particular department and have him devote himself principally to administrative work, except for an occasional lecture on some branch of his special line of professional engineering. If he is big enough for the office of dean there will be no great danger of his showing partiality for a particular department, whether he is head of it or not, but if he retains such headship when his administrative duties should require the major portion of his time, he must either neglect his department or his deanship.

In institutions where the requisition system obtains, it should be the duty of the dean of engineering to approve, or at least recommend approval or disapproval of, requisitions for supplies or equipment for the departments of his school, and in any case, the heads of his departments should confer with him before making major expenditures. They should also confer with him before making recommendations to the engineering faculty regarding material changes in the content of their courses of study.

As in any business enterprise, there should be an understudy ready and qualified to take up the duties of departmental heads, and those of the dean of engineering, in case the heads should be absent or should drop out of the institution. The dean's understudy might be assistant dean, and certain portions of the routine administrative duties of the office of the dean should be handled by him at all times. There should also be adequate clerical and stenographic help available, but unfortunately this is not always the case.

CALVIN H. CROUCH. It is doubtless true that many of us in selecting instructors place more emphasis upon practical experience than upon advanced degrees, but I do not think it means that our engineering instructors are inferior or have less qualifications than the instructors in the liberal arts and other schools and colleges.

It does mean, however, that we believe our instructors should have

something beside academic training, a something that we consider of greater value than one or two years of advanced scholastic work.

The fact that we place such a high value upon successful practical experience doubtless causes the instructors to prize the advanced degree less highly than the instructors in the liberal arts college.

Many engineering schools make a practice of giving a second or advanced degree after a certain number of years of successful practical engineering experience and upon the presentation of a thesis.

If those engineering instructors who could thus qualify would only go to the trouble of preparing a thesis, the percentage of engineering instructors with second degrees would compare more favorably with the percentage of instructors with a second degree in other kinds of schools and colleges.

Personally, I do not think the figures quoted indicate that the engineering instructor is inferior to his brother in other lines of work.

#### ELECTION OF OFFICERS

The following officers were elected: Chairman, C. R. Richards, Illinois; secretary, R. L. Sackett, Pennsylvania.

## SECTION OF HOME ECONOMICS

WEDNESDAY MORNING, OCTOBER 20, 1920

Papers on the subject of organization among farm women were presented by Miss Ola Powell, States Relations Service; Mrs. Nellie Kedzie Jones, University of Wisconsin; Miss Juliet Lita Bane, University of Illinois; and Miss Neale S. Knowles, Iowa State College.

### ORGANIZATION AMONG FARM WOMEN IN THE SOUTH

BY OLA POWELL

The underlying principles and general policies followed in developing the southern organization of home demonstration work among farm women and girls are identical with those used in developing the farm demonstration work among men and boys. The ultimate object is not only to develop leaders, but to build homes, change conditions, and develop the whole lives of our people.

Dr. Seaman A. Knapp, the founder of farm demonstration work, always told his agents that the basic principle of the whole program was to increase the income of the farm home. Since the civilization of every country is based upon the average income of its people, this is vital and fundamental. So the home demonstration work, as it developed, was built upon this foundation. In so far as the agents have adhered to this principle, in just so far has their building been permanent.

Emphasizing productive activities has not only made for increase of income, but has furnished the business training which often enables the club members to see and take advantage of opportunities right at hand, thereby making them satisfied to stay on the farms.

The value of home demonstration work to those who have been the actual demonstrators cannot be estimated nor tabulated, but that their lives have been brightened, their homes and communities made better, is shown by the many outward evidences, and through the many expressions of appreciation from those who have participated in the work. There is abundant evidence that the work is resulting in better homes and more contented farm families.

After the agent has aided the demonstrator in increasing her income through various productive activities, advice is sought on the wisest and most effective expenditures of these funds.

The success of the home demonstration work in the South is due:

First: To plan of organization.

Second: To the type of agents selected.

Third: To the methods used in selecting demonstrators.

Fourth: To the ways of developing leaders.

(1) *The plan of organization.* This is of the greatest importance. The plan is to reach every member of the farm family through the two local demonstration agents—the county farm demonstration agent and the county home demonstration agent. The organization in the South has

closely connected these two lines of work. The men's and women's work run parallel, but merge at the apex—the home. Our organization places the men and women in coordinate positions and makes the county farm demonstration agent responsible for work with men and boys on the farm, and the county home demonstration agent responsible for the work with women and girls on the farmstead, that is, the home and its immediate environment.

The same agent is guiding the girl at the age of 16, 18, 20, and 25 years, and on through the program of work for women. The agent often gains the confidence of the mothers, through the success obtained with their girls. Our girls in the South so soon become our women that we cannot draw an arbitrary line and say when they are girls and when they have become women.

(2) *The selection of well-trained, devoted agents.* The early agents, in many cases, were not as well trained as those are required to be who are now entering this field, but they were devoted workers who caught the spirit, learned the methods, and followed the instructions. They set standards and established results which have become precedents and guiding stars for their successors. Their singleness of purpose and thoroughness made success more certain. New agents with more elaborate training are often in danger of attempting to teach too many things at once. They should never forget the idea Dr. Knapp always emphasized in his talks to agents of doing one thing at a time, and doing that well, before undertaking another step.

The woman who begins her duties as a county home demonstration agent by undertaking to instruct all the farmers' wives in her county by public speeches and by articles in the county paper has reversed the logical order and cannot get the best results. It is always unfortunate for the agent to put publicity before demonstration. Dr. Knapp told his agents never to push their plans in front of them, for he said, "Some will anticipate the results and be disappointed when they come. The element of surprise will be forestalled. Others will antagonize because they will consider the theory rather than the practices. There are some people in every community who are ready to take issue with everything which you may offer. They cannot argue against results. Lessons written on the ground, and in the homes and lives of people, in the form of better crops, more beautiful homes, and healthier, stronger bodies, cannot fail to be convincing."

In discussing the qualifications of the home demonstration agent, Mr. O. B. Martin, of our office, compares the agent to an athletic coach, as follows:

"The woman county agent should be a coach, trainer, and guide. Football and baseball coaches are teachers worth while, and there is much pedagogy in their work which educators generally might study with profit. They select the men for the respective positions and then stay by each man until he masters his job. When the real public performance takes place, the coach may not be in sight, but the evidences of his training are plainly visible to all those who at all understand the game. This is true in the club work done by the girls and the object lessons in home making conducted by the women. The community may not know how much coaching an agent may do with the individuals and with groups of individuals, but by and by it will see the effects thereof. In an organization, at the maximum, of more than 1,000 women workers, many of whom were public school teachers, it

is difficult for all of them to see the importance of training. They naturally want to talk about teaching, instruction, forming classes, and giving lessons. They do not all seem to realize that training is more important than teaching. It is not enough to tell, or to teach, but it is necessary to see that the person being taught is able to do the thing. In this plan of procedure, the demonstrator becomes the teacher and furnishes the object lesson."

(3) *The selection of the demonstrator.* The foregoing suggests the types of demonstrators that are first selected. Anyone who chooses may become a demonstrator. The agent attempts to create the desire in them and then encourages the demonstrators to seek more knowledge as the need increases.

There is only one effective way to reach and interest the farming classes, and that is by object lessons. To impress the public mind it is well to have a few selected demonstrators succeed so well with the undertaking that others are attracted by the results and will become anxious to secure similar instruction and help.

The agent is always carrying on intensive training in different lines of work with a few individuals or small groups, and some groups are working in advance of others. At the same time, general instruction is being given through the larger bodies throughout the country.

(4) *The selection of leaders.* The selection of leaders is put upon the basis of accomplishment. This furnishes a democracy of opportunity. The person in the very humblest home may become the leader in her club or community, because of some fine success which she has attained. We cannot arbitrarily choose Mrs A as a leader in her community for any phase of demonstration work simply because she has means of getting about or is a person respected because of social or financial position. Wherever the germ of leadership is found and developed that person will naturally become the leader. One woman may become a demonstrator and be a leader in one phase of work one year and another interested in the same line of work may prove to be the leader another year. This selection must be based on successful work and achievement in order to hold the interest and maintain the enthusiasm of all the club members.

The people are always glad to follow real leadership and they readily recognize it. We do not advertise that we are wishing to find the trained leaders. Our efforts are devoted toward the general development of the largest number of people, encouraging each and all to do their very best because of the good effect it will have as an object lesson on the whole community, thus placing the responsibility on every demonstrator to attain the highest possible success. In this way each demonstrator becomes more and more of a leader in her group.

The prime duty of the agent to teach through others is being fulfilled and there is naturally a development and distribution of leaders. The marching orders always given to the army of agents in the South are, "Your value lies not in what you can do but in what you can get other people to do." There can be no reform until the woman begins to grow and the only possible way to grow is by achievement, doing something of which she is proud. As soon as a demonstrator begins to grow she will work for other rural betterment and be of untold help to the agent in spreading information and in developing other leaders.

Naturally, the girls who have succeeded with their club work for three or four years and continue to be demonstrators in the women's home demon-

stration clubs develop special skill in certain lines of work and often become our finest workers and best leaders among the women.

The agents organize and use machinery to get results and then encourage the larger organization of those who have succeeded. The demonstrators achieving the most outstanding results usually take important places on the community committees and county councils and are active in bringing about all-round community betterment.

Dr. Knapp did not live to see the home demonstration program unfold, but he planned and prophesied the development in its entirety. The following extract, taken from one of his speeches made in 1907, shows five essential points in the program of development of the home demonstration work up to the present time. He said:

"Our greatest need being a wider knowledge of common things, the agent who really enters into country life and seizes its opportunities for developing the resources of the country, for increasing the harvests, improving the landscape, brightening the homes, and flooding the people with knowledge about helpful things, will never want for friends nor for a place to work."

This defines the reach and scope of the work being carried on by the home demonstration agents. If we could take a bird's-eye view of the field right now, we could see hundreds of earnest women who are being guided by this prophecy as they travel by auto or team, on foot or horseback, from home to home, *developing the resources, increasing the harvests, improving the landscapes, brightening the homes, and flooding the people with knowledge about helpful things.*

It might be of interest to note here that there are now in the 1,359 agricultural counties of the 15 Southern States 1,093 agricultural agents carrying on farm demonstration work among men and boys and 734 home demonstration agents who are responsible for extension work with women and girls. About a million demonstrators and club members are enrolled in the various lines of activity.

The home demonstration work is now recognized in the South as a comprehensive system of education for rural home makers, its object being the finest and fullest development of women and girls through the use of all the many resources of the farm home and the farm community.

The future alone will show the influence of this new work in National development.

#### RURAL SCHOOL SUPERVISORS, WOMEN'S CLUBS, AND COUNTY SHORT COURSES

BY NELLIE KEDZIE JONES

The age-long story of Mahomet and the mountain is repeated in present-day extension work.

Women who live on farms and in small villages will not go to the university for help in solving their many problems, so the home economics department must go to them. How can we reach the greatest number in the most efficient way?

I am asked to tell of a State fair camp, women's clubs, and county-seat short courses, which are some of the ways we are trying to answer this question in Wisconsin.

## RURAL SCHOOL SUPERVISORS

Every county in Wisconsin has supervisors who go about among the rural schools helping the teachers by suggestion and by actual teaching to know how to better handle their work. These supervising teachers become acquainted with every teacher in the county. They stay nights in the farm homes, and thus become acquainted with families in every district. We have felt that supervising teachers were a real power in their counties and in order to give them an idea of what the university is able to do for the people in their own territory, we arrange to have a "Teachers' Camp" at the State fair. In 1920, which was the third year of this camp, we allowed every county superintendent to send not only his supervising teachers but some rural teachers also. We had nearly 200 school people, most of them in touch with country school districts. The fair management furnishes tents, cots, and mattresses. Each teacher brings her own blankets, her dishes, napkins, and dish towels. There are four tents. Everybody sleeps in "the big top," where the cots stand on green grass. A second tent with running water and plenty of white enamel basins and mirrors gives everybody a chance for personal comfort.

The cook tent, equipped with electric stoves and board tables, shelters the extension workers who take charge of the meals, while colored helpers do the rougher part of the kitchen work. The meals are served cafeteria style, each person lining up with her plate and taking whatever she wishes from the table where the food is placed. As soon as she has served herself, she goes into the lecture tent which is provided with seats and tables. There the teachers gather in groups and visit while they eat, becoming acquainted with each other, exchanging experiences, telling stories, and having "a real party," three times a day. As soon as one finishes her meal she goes to the table provided with hot water, washes her own dishes, and carries them back to her "room" in the big sleeping tent.

Most of the time is given to the exhibits at the fair, but two lectures, an hour each, are given every day for four days. The subjects vary, but are always planned to be of special interest to the teacher who works in rural communities. Sometimes the lecture is on home demonstration agents and their mission, followed by the presentation of a home demonstration agent who gives a chapter or two out of her own experience. Another lecture may be given by the professor of animal husbandry on "Dairy Cattle of Wisconsin," followed by a "personally conducted" tour to the dairy barns. Another on "The Growing of Small Fruits and Apples in Wisconsin" may be followed by a lecture on "Diseases and Insects Most Troublesome to Small Fruits in Wisconsin." A lecture on "Chickens," followed by another "personally conducted" tour to the chicken show, gives many teachers much knowledge which they will use in the districts where they teach. We had this year more than half the counties of the State represented and every teacher not only became personally acquainted with members of the home economics extension division of the University, but came to understand more about the university and its work.

The cost to each teacher for entrance to the fair ground, board, lodging, lectures, entrance to the grandstand and to the horse show, was \$7 for the week.

This gathering of teachers means better ideals in the school room.



Many teachers said they were going home and put into practice some of the things shown at the educational building or some said that their schools could do certain things better than those shown there.

Many supervisors learn to know something of what a home demonstration agent can do in a county, and go home to talk about the desirability of having one. They meet some of the extension workers and being leaders in their communities are ready to suggest and even to urge meetings where the extension specialist can meet the women in various country districts.

These young women learn much about the importance of better food, and are always surprised that such good meals can be served for the small outlay of money. They begin to realize what good home economics training can do in the food line which always makes a strong appeal, when teachers are putting in such strenuous work that they are hungry three times a day. Many members of the camp said repeatedly, "I don't seem to want to buy things to eat on the fair grounds, we get such good, satisfying food. I don't see how you make ends meet."

The county supervisor or the rural teacher has a happy and inexpensive outing where she gains many helpful ideas, not only about her special line of work, but about the wonderful resources of her State. Personal acquaintance with specialists leads to knowledge of the extension work carried on by the State university, and the teacher is ready to advise her district women to try to have the home demonstration agent or a specialist come to her own school house to hold meetings.

The teachers' camp gives opportunity for visions, and many teachers go home to do better work and to bring into their districts influences that raise the standards of the community because of the visions caught at the teachers' camp of the State fair.

#### WOMEN'S CLUBS

When a group of neighborhood women plan to meet once in two weeks, they like to be organized into a club. We have found that in home demonstration agent work a club of country women will take great interest in the work the home demonstration agent can bring and will at once begin to plan work for themselves and their communities. One county in Wisconsin has 14 country clubs of country women and five community clubs. The fact that the State federation averages less than four clubs in a county makes it seem that 19 clubs are a large number for one county, but when one remembers that this county has 40 townships and it is estimated it would take six clubs in a township to include most of the women, a very small amount of arithmetic shows that 240 clubs in that one county would not overorganize the community. These country clubs each adopted a constitution, making out a program for six months or a year ahead, and meet at the various homes. Some of the clubs have taken up special local work, like caring for a neighbor's family when the man of the house had a long illness. The club divided into sections, took the entire household care from the shoulders of the mother, bringing food day after day, taking care of the laundry, taking the small children home, and continuing to help the stricken family until the patient recovered. Another group sewed for the children in two families, from each of which death had taken the mother. Some of the groups have taken up the hot lunch project and are planning

for 100 percent hot lunches in the schools of that township. Still others are working on the introduction of labor-saving devices in the various homes. The best washing machines, the newest pressure cooker, are vital topics of conversation. Still another group planned only for happiness. One president said, in a rather apologetic way, "We haven't done much this year. When the war closed, there were many homes in our neighborhood where sons were wounded or didn't come back, and everybody was so down-hearted and sad, we thought we would just try to have some fun, so we planned to have a good time at every meeting. Next year, maybe, we will do some work." It may be possible that this year's work of "having a good time" has done more for that community than any other line of endeavor. We have communities where factions prevented friendships, and the women's club has done much toward encouraging neighborliness. The fact that the women gather in each other's homes and talk over their various problems gives not only an opportunity for solving such problems, but unifies the community. Whenever a club wishes to have a special demonstration on some home topic, the home demonstration agent either goes herself or sends to the university for the specialist. A special meeting, with special program, usually brings out every member. A project leader in every club to urge work on a certain project is most helpful. For instance, when a club wishes to take up poultry work, every woman in the community who keeps chickens gets help if she wants it. If the club work is along the line of clothing, the clothing specialist brings several lessons. She may give one afternoon to patterns, another to children's clothing, another afternoon to home dressmaking before the whole club, or she may take a group of ten in one neighborhood and teach them to be the local leaders in certain lines of clothing work. These ten go to other clubs, and thus spread the gospel of better clothing for less money.

In counties where there is no home demonstration agent some "home-makers' clubs" have been established. The specialists have written outlines on various subjects, such as "Child Feeding," "The Old House Made New," "Stretching the Dollar," "School Children's Clothing," etc. These outlines give material for the club leader to use, and there is opportunity for several meetings to be held, if the club wishes, on the subject taken up by one outline. An effort is always made to have several members of the club feel some responsibility for each meeting, and if a member thinks she can't write a paper, she is asked to tell the club something about some special line of work in which she excels. One club woman was asked to take a topic under the outline "Stretching the Dollar." She insisted that she couldn't write a paper and didn't know anything that would be suitable to present to the club, when one woman suggested, "You make such fine soap, would you tell us how to do it?" The soap maker most happily promised, and that club is enthusiastic over the best talk they have had, for they all learned much about good home-made soap. Incidentally she helped several of her neighbors to stretch some of their dollars.

The home makers' clubs are urged to study local conditions and as soon as a real need is recognized to take a hand in supplying that need. One club helped the teacher provide a Victrola and some good records for the country school. One, in a small country town, is talking of buying a moving picture machine, so that films sent out free of charge by the

university can be shown, not only in their own village, but can be taken into the country school houses.

In one county through the efforts of the home demonstration agent, a county federation of women's clubs has been formed with 15 clubs. A definite piece of county work was undertaken at once by passing a resolution praying the county board and the city council to provide and maintain a rest room in the county seat, where women may be comfortably cared for whenever they come to the city. Every club delegate promised to see members of the county board and urge the establishment of a rest room. One member of the county board said, "Of course it will pass. Whenever we find out that the women want something, that's what we vote for."

In Wisconsin, the president of the State Federation of Women's Clubs recognizing the important part played by a home demonstration agent definitely urged the delegates, at the last annual meeting, to work for the appointment of home demonstration agents in their own counties. She says, "I recommend the appointment of a committee in every club to investigate the work of home demonstration agents, the need for them in your counties, the ways and means of securing them, and action and immediate cooperation. Let us no longer view her as a luxury, but as a necessity."

The formation of clubs develops leadership and disseminates knowledge of various kinds. It gives every woman a personal sense of responsibility for her neighborhood. She will have more pride in helping bring in improvements of various kinds. The schools will be bettered. Entertainments will be brought in or put on. Country life will be made more attractive, and country women will have less drudgery and more happiness. A partial solution of the problem of keeping the boy and girl on the farm is in the hands of the country woman's club.

#### THE COUNTY-SEAT SHORT COURSE

Most of the country girls in Wisconsin leave school when they have finished the eighth grade. In many districts, if a girl is 14 years old on Thursday, she doesn't go to school on Friday, because "she doesn't have to." Home demonstration agents in Wisconsin recognizing the fact that girls from the ages of 15 to 20 have little opportunity to gain home economics knowledge, planned the "County-Seat Short Course," asking country girls to gather at the county seat for a week of home economics work. The first short course was held in Marathon County, and brought 40 girls from 20 townships. Most of them had friends in the county seat where they could stay in homes. For those who had no personal friends, boarding places were found. The central school building, with finely equipped laboratories, was loaned for the use of the home demonstration agent during this week and specialists in food work and in clothing work were sent from the home economics department at the university to do most of the teaching. These 40 girls were divided into two groups. One group cooked, the other group sewed, for two and one-quarter hours. Then the groups changed work, and put in another two and one-quarter hours, making a full forenoon. The cooking work was so arranged as to give experience in using the kind of materials found in every well-stocked farm

home, by making dishes that were somewhat different from the usual boiled potatoes, fried meat, yeast bread, and pie. .

The sewing centered around a dress. Every girl brought material and finished for herself a gingham dress. Of course, some of these girls had never sewed before. Others had sewed some, but had not used the sewing machine. A third group had done more or less of the family sewing. It was noticeable that the ones who had done most sewing beforehand were most enthusiastic over what they learned during the week of the short course. On Saturday, at the close of the week, both classes working together prepared a dinner which was served in the long corridor to pupils, teachers, and some officers of the central school, to the number of 50. Everybody sat down at this "family" table and when there was occasion for replenishing food or changing plates, each tenth girl rose and took care of her "family."

The afternoons of the week were devoted to demonstrations. A clothing demonstration by a prominent dressmaker in the town gave them new ideas about selection, making, and wearing of various garments. A house arrangement and house furnishing demonstration by the specialist from the university showed many inexpensive ways of beautifying the home. A poultry culling demonstration was full of interest for these young women who do practically all of the poultry work at their respective homes. One evening the whole group dined together at the best hotel in town, where they were guests of the banks. After the fine dinner, which was served at decorated tables, they were taken to a good movie and given the most delightful evening many of them had ever spent. Many of those 40 girls have written letters telling how thoroughly they enjoyed the week, speaking of the many items of valuable information they have taken home and telling how they have used the knowledge gained during the county-seat short course.

The county is eager to have another short course just as soon as it can be planned. The girl who took home a finished gingham dress is sure she can make another dress. Those who made new combinations of food enjoy giving the family the benefit of such knowledge in good "eats" and the instruction given on better combinations of foods, on better feeding of the family, or better use of the every-day materials found at home, will result in better health for many communities.

A second short course, which was held in La Crosse County, arranged to have the girls live together during the week. The assembly room of the county agricultural training school was cleared and cots set up. Each girl brought her own bedding. Teachers and pupils lived together in the school, making one large family. The school was divided into groups, as in the first short course, but one group took turns every day in caring for the dormitory under efficient supervision. The cooking group, under the guidance of a food specialist from the university, had the work so planned that the results of the cooking classes were turned into a meal, and every girl saw the fruits of her labors brought on to the table and served for the whole school. As in the first short course, the clothing specialist from the university had charge of the sewing. Every girl brought material and made herself a gingham dress. By arranging to have all the girls live together, 15 minutes of outdoor gymnastics were possible every morning. The afternoons were devoted to demonstrations or sightseeing of various

something beside academic training, a something that we consider of greater value than one or two years of advanced scholastic work.

The fact that we place such a high value upon successful practical experience doubtless causes the instructors to prize the advanced degree less highly than the instructors in the liberal arts college.

Many engineering schools make a practice of giving a second or advanced degree after a certain number of years of successful practical engineering experience and upon the presentation of a thesis.

If those engineering instructors who could thus qualify would only go to the trouble of preparing a thesis, the percentage of engineering instructors with second degrees would compare more favorably with the percentage of instructors with a second degree in other kinds of schools and colleges.

Personally, I do not think the figures quoted indicate that the engineering instructor is inferior to his brother in other lines of work.

#### ELECTION OF OFFICERS

The following officers were elected: Chairman, C. R. Richards, Illinois; secretary, R. L. Sackett, Pennsylvania.

## SECTION OF HOME ECONOMICS

WEDNESDAY MORNING, OCTOBER 20, 1920

Papers on the subject of organization among farm women were presented by Miss Ola Powell, States Relations Service; Mrs. Nellie Kedzie Jones, University of Wisconsin; Miss Juliet Lita Bane, University of Illinois; and Miss Neale S. Knowles, Iowa State College.

### ORGANIZATION AMONG FARM WOMEN IN THE SOUTH

BY OLA POWELL

The underlying principles and general policies followed in developing the southern organization of home demonstration work among farm women and girls are identical with those used in developing the farm demonstration work among men and boys. The ultimate object is not only to develop leaders, but to build homes, change conditions, and develop the whole lives of our people.

Dr. Seaman A. Knapp, the founder of farm demonstration work, always told his agents that the basic principle of the whole program was to increase the income of the farm home. Since the civilization of every country is based upon the average income of its people, this is vital and fundamental. So the home demonstration work, as it developed, was built upon this foundation. In so far as the agents have adhered to this principle, in just so far has their building been permanent.

Emphasizing productive activities has not only made for increase of income, but has furnished the business training which often enables the club members to see and take advantage of opportunities right at hand, thereby making them satisfied to stay on the farms.

The value of home demonstration work to those who have been the actual demonstrators cannot be estimated nor tabulated, but that their lives have been brightened, their homes and communities made better, is shown by the many outward evidences, and through the many expressions of appreciation from those who have participated in the work. There is abundant evidence that the work is resulting in better homes and more contented farm families.

After the agent has aided the demonstrator in increasing her income through various productive activities, advice is sought on the wisest and most effective expenditures of these funds.

The success of the home demonstration work in the South is due:

First: To plan of organization.

Second: To the type of agents selected.

Third: To the methods used in selecting demonstrators.

Fourth: To the ways of developing leaders.

(1) *The plan of organization.* This is of the greatest importance. The plan is to reach every member of the farm family through the two local demonstration agents—the county farm demonstration agent and the county home demonstration agent. The organization in the South has

from \$250 to \$1,660. Only a very few counties have not yet made appropriations. The budgets for our county work range from \$3,000 to \$4,500. In practically every case, the budget has been materially increased in each succeeding year. In almost every case the number of memberships has substantially increased. In one of these cases it has remained stationary and in the other two it has dropped slightly for reasons easily explained.

It might be interesting to note that the members of the farm bureaus of Illinois pay \$10 per year membership fee, plus \$5. for membership in the State federation of farm bureaus. It has been our experience that people are willing to pay for what they really want and what they think is worth while. Only the more progressive people will take up this work, and a sum of money large enough to attract their attention will in most cases insure an interest in the organization. It is their interest we need in order to make the work successful. An advisor, no matter how well trained nor how devoted to her work, cannot possibly touch more than a small number of persons, unless she has interested people to work through and is enabled in this way to multiply her efforts. A ten-cent organization compels about ten cents' worth of interest. We need more than that.

Before anyone asks the question, for I am sure someone will ask it, I shall give you our answer. Someone will ask, "But what about the poor women, the ones below the level where they can afford to pay this fee?" Our answer is this, "Education has touched only the people who have reached out for it and made some sacrifices for it." We feel that membership in the home bureau is a good investment even though some sacrifice must be made to pay the fee.

We assume that charity organizations are intended to take care of the people too poor to take care of themselves and we do not agree at all with the statement made some time ago by a woman who was trying to interest other women in the work and who said, "The United States Department of Agriculture is fostering the biggest piece of charity work that was ever undertaken." And this statement will have to be answered, too, "But you don't reach the women who need it most." I like Vice-Director Hand-schin's answer to this, "No, neither does the drunkard espouse the prohibition cause, nor the spiritual derelict the Church." We have to work with the people who have vision enough to see possibilities in this work and who by the force which they exert in pulling themselves up to a higher level, pull others with them.

In working toward our aim we have built up certain machinery which we have found useful in promoting our instruction. The home bureau organization is this machinery. The organization consists of an executive board, an advisory council, and county and community committees. The executive board is composed of a president, vice-president, secretary, treasurer, a county chairman for each of five different committees representing different phases of work. The lines of work usually selected are these: Foods, clothing and home furnishing, home management, health, and recreation. The executive board meets once a month to transact the regular business of the organization. The advisory council is composed of the chairman of the community committees in the various units. The advisory council meets at least once a year, and more often when the organization is new. The chairmen who are members of the executive board, and the various committeemen throughout the communities form our county com-

mittees, i. e., the county health chairman sits on the executive board and she is also chairman of the county health committee. This committee is composed of a health committeeman from the various communities in the county. In some cases there may be a health chairman on the executive board and no committeemen in the communities if no definite work in health is being carried on. It has been the opinion of our home advisors that it is a wise plan to have the various phases of work represented on the executive board in order that the county work may maintain the proper balance. The community committee is composed of the chairman and committeemen selected to represent some phases of work corresponding in general with the subjects represented on the executive board. Working out from the central office are specialists in the various lines represented on the executive board with the exception of recreation.

Since our method of organization leaves considerable responsibility with the advisor we have made an effort to secure only well-trained women. We require the following qualifications: (1) Graduation from a four-year home economics course in some recognized college or university; (2) first-hand practical knowledge of farm life; (3) successful experience in some line of home economics work after graduation; (4) five years' experience in educational work or in home making.

The organization operates something after this fashion: The county home advisor meets with the advisory council and presents to them some possible pieces of work. Sometimes a specialist attends this meeting also, if the county has expressed an interest in taking up some piece of work in her particular field. It is often possible for her to present the work more clearly than the advisor could present it, since the advisor has many pieces of work in mind. It is necessary that the advisor be on the ground for several months before she can be of much assistance in selecting suitable work to be undertaken by this particular county. Suppose she has had an unusually large number of demands for help in making over old clothing. This would naturally lead the advisor to the conclusion that there had been a great deal of unwise buying in this county, else the individual would not have been dissatisfied with the clothing and would have been willing to wear it out. Bad choice of material and fashion are the two factors which usually bring about the remodelling of clothing. The proper selection of clothing, therefore, would be one of the lines of work she might suggest to the advisory council. Out of this meeting of the advisory council would come some fairly well formulated ideas as to the work to be undertaken in the county, since each community would be represented, and an opportunity given for free discussion of possible work to be undertaken. The final decision would be made when the executive board met with the advisor. Perhaps the specialist would attend this meeting also. After the lines of work have been determined upon by the advisor and the executive board, jointly, the advisor consults with the specialist in clothing along the lines of subject matter and methods. We believe that if the work is to be successful it will require careful thought on the part of both the advisor and the women in the county; the advisor's part being to show possibilities in various lines of work and the need as she sees it, and the board's part to assist, out of their experience, in determining the county needs, making a selection of work and carrying it out. After a conference with the specialist, the county clothing committee is called and



the advisor outlines plans of work with this county committee. The specialist may or may not be present at this meeting depending upon whether or not the advisor needs her services. The advisor and specialist are responsible for the selection of subject matter, but they call upon the county committee to assist in making and carrying out the plan of work. They may decide to have a lecture in each community, or in groups of communities on economics, laying especial emphasis on our responsibility as buyers, then they may have some conferences and round table discussions of clothing budgets, and they may plan a project in the keeping of budgets and the selection of clothing. In case this subject seems too large they may choose the selection of the particular pieces of wearing apparel which the advisor has been called upon to help make over. This, in general, indicates how our machinery is used in carrying over the instruction.

Sometimes the plan is simpler than this one. In one case, for example, our specialist in home furnishings met with the county clothing and home furnishing committee and gave them four days of instruction in home furnishing. The specialist emphasized the points to be carried back to the community. We expect only the simple information to be given out by the women themselves. We do not expect them to give elaborate discussions of technical subjects. However, if the instruction is successful there are principles taught which each woman can understand, put into practice, and help her neighbors put into practice. In this case, the women reported at a community meeting the information which they had received at the meeting of the county committee, and in several cases, although more than a year has elapsed since the specialist met with this committee, the women report that they are still being called upon by their neighbors to give assistance in planning home furnishings.

Out of experience of more than two years in establishing this form of organization, we believe, and our advisors and executive board members have gone on record as believing, that the organization is efficient in bringing to its members instruction which is useful to them in their home making.

We realize that the family farm bureau has certain advantages. However, we feel that the home bureau organization as it has been developed in Illinois, meets our needs more satisfactorily. In the first place, the woman's profession as home maker, a profession distinct in itself, is given recognition in a way to make both the home maker herself and other people appreciate more keenly the importance of her profession. It is taken out from among the sub-heads. For example, I saw in a program for one county farm bureau, last year, where the family form of organization was used, something like this, "Livestock," "Soils," "Home," "Small Fruit." We feel that the home, by virtue of the service which it renders both to individuals and to society, deserves more consideration than this program indicates.

It has been our observation that a distinct organization receives cooperation from its brother organization, the farm bureau, and that, in general, work performed by these two organizations, each respecting the rights of the other, accomplish quite as much work and with less friction and less wastage of time. Both the women and the advisors have a conscious pride in the dignity of their home bureau organization.

The interests of the farmer and the home maker, in the main, are different. The home maker has her duties, the farmer has his duties, and they have a number of common interests. We have found that these com-

mon interests do not suffer, but rather profit, by the attention of two cooperating organizations. In the last analysis, the purpose of any organization is to carry on work, and the organization which enables its members to work most effectively is the best organization for that particular undertaking. We believe that the home bureau organization, as we have worked it out in Illinois, is the best machinery of which we have any knowledge for carrying out the purpose of home economics extension, as we in Illinois conceive it to be.

## WOMAN'S ORGANIZATION IN THE FARM BUREAU

BY NEALE S. KNOWLES

The big aim of rural organization is to work together for that degree of agricultural contentment which cannot be achieved without the most perfect team work. Even the most indifferent analysis of the term reveals the fact that our conception of contentment must include more than financial gain. Farm homes include women and children and an effort to bring about agricultural contentment must include consideration of all of the phases of life that affect women and children from the standpoint of home and community conditions.

The committees who formulated the original plans for farm bureau work had this in mind, when they said, "The farm bureau is organized for the purpose of developing greater interest in agriculture and home making." The joint partnership of men and women on the farm was recognized in that original plan and stands as a fundamental factor in rural organization.

The pursuit of agricultural contentment very logically begins with an organized effort to improve financial conditions, but this is only a first step. Add to that an equally well organized effort to develop high standards of home and community life and we have accepted "Farm, Home, and Community," as our farm bureau slogan. This slogan demands the active concerted efforts of broad-minded men and women. It demands thorough organization for perfect team work among men and women. It demands broad vision and high ideals concerning farm, home, and community life.

Organization and exchange of ideas will give a broader vision to the man who said, "Don't talk to me, all I know is work and weeds." It performs the same office for the wife who said to her progressive neighbor, "I am just an old work horse with my nose to the ground. I have no time for community clubs or home study."

Organization makes it possible to study the needs of the community and to formulate plans for meeting those needs. Organization helps to discover leaders, and through the assignment of tasks to develop those leaders. Organization develops that fine community spirit and team work which help to break down those petty quarrels that so often are caused by envy, selfishness, and misunderstandings through lack of neighborly contact.

The family plan of organization in the farm bureau recognizes all of these points and sets up an organization of men and women who see these problems and are anxious to work out the best solution possible.

The \$5 membership includes the man and his wife. Both are expected to bear the responsibility of building up the farm bureau, and both are entitled to the benefits of the organization. One five dollar membership, however, entitled the family to only one vote. In cases where both the

man and wife desire a vote and wish to be regular, registered members, two memberships are taken out. The funds from membership and from Federal and State sources are budgeted to cover salary, travel, specialists, and other expenses of all employed agents.

In perfecting the county organization, farm bureaus recognize the value of having women on the board of directors and in most cases one or more women are elected to this board. The woman who has been chosen for county project leader is usually the first woman to be elected to the board of directors. Some farm bureaus have placed three women on this board and some in addition to this have elected a woman secretary. Three farm bureaus have elected a woman from each township to serve on the board of directors.

Township organizations provide for the election of chairman, vice-chairman, secretary-treasurer, and a cooperator in each school district.

The township chairman acts as chairman of project committee for her township and may appoint such other project chairmen as are needed. The township leader is the leader of the work in her township and takes the initiative in developing leadership among her school district cooperators. The school district cooperators serve as chairmen in their own communities and work in close cooperation with the township chairman. In most cases they are instrumental in forming community clubs in each school district. The aim is to extend the organization to each individual in the school district, and the slogan is, "Take the farm bureau to every man, woman, and child in every home in the county."

The advantages of such a system are made evident by the study of a home and community survey put on by farm bureau women in four townships in Scott County. When asked if it was not difficult, the women said: "No, the township was well organized and each woman did her part." The women were also asked what the advantages were in putting on such a survey. The answer came very promptly: "It helps us to work together and to know each other better. It also reminds us of our home and community needs and suggests a remedy."

Round-up county meetings of farm bureau men and women are held at least annually at a banquet or farm bureau picnic. At these times programs of interest to men and women are presented. Round-up county meetings of farm bureau women are held at least twice a year. These meetings are attended by county and township officers and are presided over by the county chairman. There are often 150 women present, every township in the county being represented. Township chairmen report on the work accomplished and plan for the future. Chairmen of project committees report on their work and all school district cooperators are called upon to report work in their own communities.

These meetings are most encouraging, in that they prove conclusively that the farm bureau women are accepting their responsibility most earnestly and that they are developing remarkable power of leadership, as well as a strong community spirit. Farm bureau men and women feel that the women have a big part to play in making the farm bureau a success and heartily believe in the family plan of organization.

The following paper by Miss Agnes Ellen Harris, States Relations Service, was presented.

# MEASURING HOME DEMONSTRATION WORK IN FINANCIAL TERMS

BY AGNES ELLEN HARRIS

Better home life, particularly in farm homes, is the result we all have in mind in conducting home demonstration work, but many of the projects carried on, in bringing this result about, are measurable in financial terms. In my seven years' experience in personally appearing before county boards of commissioners and seeking State appropriations for home demonstration work, I have found the majority of the members of appropriating boards influenced favorably toward this work by such things as increase the interest of the girls on the farms in better education, make the homes on the farms more attractive places in which to live, and result in better selected and prepared food for the farm family. There were members of these boards, however, who thought in terms of economic improvement, and who were influenced in making appropriations by the fact that for every dollar appropriated there was more than a dollar saved or earned by a girl or woman in the county.

Home demonstration work in both the 15 Southern States and in the 33 Northern and Western States has been developed with the same general aim in view, but because of certain conditions the work was introduced in the South through a few definite projects—gardening, canning, poultry raising, and butter and cheese making—the results of which have a financial value which can be estimated with sufficient accuracy to prove to the public that there is an economic value in home demonstration work.

The work has developed in the South until its scope is as broad as is home making, yet these projects are still being carried on and very definite reports of the economic value of the work to the country are available.

For this fiscal year, 1930-31, there has been an increase of more than \$339,709 in the total funds expended for home demonstration work in the 15 Southern States. Of the 1,359 agricultural counties in these States, 565 are organized for home demonstration work. Statistics secured from the 500,000 girls and women enrolled in 20,323 clubs, in 1919-20, indicate that the value of the products made in carrying out the work in food preservation, poultry raising, butter making, and cottage cheese making, is more than \$14,000,000. Of this, \$12,000,000 is the estimated value of the food preservation work. None of these projects is more important than other projects carried on in the South, but these four have a financial value to the women, and although it is understood that this is an estimated value, it indicates to the public that there is an economic value to the country in the work of the home demonstration agent. The general method followed in the Southern States in securing these statistics is to have the home demonstrator report at club meetings the results obtained in her work at home. In many States simple blanks are furnished for her to make the report on. The president of the club frequently is the one who summarizes these reports and sends them in to the county home demonstration agent.

In the Northern and Western States, in many instances, the same bureaus and boards are supporting home demonstration work, boys' and girls' club work, and the county agent work. The following table shows the comparative increase in total funds expended in the support of these three lines of extension work, the number of counties organized for each line of work,

and the total estimated value of the products in a few of the projects carried on in 1919.

FUNDS AVAILABLE, COUNTIES ORGANIZED, AND VALUE OF PRODUCTS IN EXTENSION  
WORK IN 33 NORTHERN AND WESTERN STATES

	Total funds for 1920-21	Increase in total funds over 1919-20	Number of counties with agents	Estimated value of a part of products
Boys' and girls' clubs .....	\$1,103,130	\$356,586	249	\$4,758,062
County agent work .....	5,665,968	777,979	1163	24,792,544
Home demonstration work .....	1,387,339	225,663	248	2,310,322

The results obtained in home demonstration work which are not measurable in financial terms more than offset the difference in the financial value as reported, but the question is, do the reports indicate fairly the amount of work of economic value which has been done as a result of the home demonstration agent service? Is it not significant to note that the county agents report meetings with a total attendance of 430,687, resulting in the establishment of 64,969 demonstrations which made a total profit of more than \$19,000,000, while 268 home demonstration agents, in 1919, reported that meetings attended by more than 2,000,000 people were held, and more than 2,000,000 people were reached through the activities of the home demonstration agent? Is this not an indication that much work was done by the people who attended meetings which was not reported, and is it not, therefore, worth while to make more definite plans to secure statistics of results obtained in projects which have financial value?

It is the purpose of this paper to urge that the results of any home demonstration projects measurable in financial terms be obtained and so reported that more accurate records of work accomplished will be available, and not the purpose to urge that any project be added to the home demonstration program for the reason that it is measurable in financial terms. Miss Bane of Illinois said to her home advisors, "Do not work to report, but report work done." This is the attitude of those who planned this discussion.

From the answers to a questionnaire sent out to the State leaders of the Northern and Western States on this subject I find the majority believe that collecting data regarding results obtained is of value to the women who establish home demonstrations, improve home economics practices in the home, and work toward community betterment because it gives them a clearer idea of the results obtained from their work. Although it is no longer necessary to justify home demonstration from a monetary standpoint, the collecting of data and giving of publicity to results obtained in those projects which mean a financial saving to the home maker and to the community has been more than justified wherever this work has been done. It is, therefore, important for those who are leading home demonstration work in the various States to give attention to the best means of collecting this data.

Experience proves that the project leader in the community is the one most likely to be successful in collecting data on work done. The success in securing this data depends, as most things do in the development of home demonstration work, on the county organization.

The following are important factors:

(1) The thorough organization of the county with community project leaders who secure data from home demonstrators in work groups.

(2) A State leader who believes that an important part of the work of the home demonstration agent is the securing of statistics, in order to determine State-wide results.

(3) The home demonstration agent who has been convinced that it is worth while to spend time in securing such data.

(4) The ability of the home demonstration agent to convey the idea to her project leaders, and through them, to her home demonstrators, that it is important, for the sake of the permanent development of the work, to secure data on work done as a result of the home demonstration agent's service.

(5) Simple report blanks worked out for each home activity.

(6) No effort made to secure reports on a project until time has been given to the demonstrator to see the results obtained through her work.

If the woman realizes that the work she is doing has a definite financial value, it tends to create within her a greater self-respect, and leads her to see the necessity for greater appreciation of her own time and energy. At a farm bureau meeting, this month, I heard a farm woman state that men are not to blame for the woman's hard work and lack of working tools. She said the fact that 95 percent of the women reported in the farm home survey had sewing machines, proved conclusively, to her, that women could get what they needed, once they were convinced of the need. "Women are naturally more economical and self-sacrificing than men," she said, "and they must figure on home improvements before they are convinced that they need them. Women do not value their own work." After giving an estimate of the value of one woman based on the partial list of her duties for 30 years and showing that the value of the work done was at least \$50,232, making an annual value of \$1,674, she closed with this advice: "Get an idea of your value. If you are worth the amount of money indicated by this one estimate, don't you know that you need machinery?"

Six years after Federal funds have been available for home demonstration work only 248 of the 1,596 agricultural counties of the North and West are organized for this work, and it is now a part of the work of the leaders, agents, and members of farm and home bureaus, to interpret home demonstration work to the men and women in unorganized counties. Data on any economic results obtained in carrying out home demonstration projects may be of assistance in reporting work accomplished to county, State, and National appropriating bodies, to men and women in counties in which home demonstration work is not organized, and to women in order to assist them to understand the necessity for a more careful use of their time and energy. Not only for these reasons, but in order to determine the value of home demonstration work from a National viewpoint, there needs to be uniformity throughout the country in methods of estimating results of this work.

The following paper was presented by Miss Gertrude L. Warren, States Relations Service:

RELATION OF BOYS' AND GIRLS' CLUB WORK TO SMITH-HUGHES HOME  
PROJECT WORK

BY GERTRUDE L. WARREN

The relation of boys' and girls' club work to the Smith-Hughes home project work may be found in a survey of the earliest agricultural legislation. In the midst of the Civil War, just after the battle of Shiloh, in spite of the stress imminent at that time, the same feeling which prompted the Congress of 1914 to pass the Smith-Lever Act prompted the Congress of 1862 to pass the act establishing a Department of Agriculture in order "to diffuse among the people of the United States useful information connected with agriculture." In 1862, Congress also passed the Land-Grant Act providing in each State "for at least one college \* \* \* to teach such branches of learning as are related to agriculture and the mechanic arts, \* \* \* in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

In time, the need for investigational work in agriculture became felt, especially by those teaching in the agricultural colleges then established. Consequently, in 1887, there was passed the Hatch Act establishing the experiment stations in order "to promote scientific investigation and experiment respecting the principles and application of agricultural science" and "to diffuse among the people useful and practical information" resulting from the research work undertaken.

In these foregoing acts may be found the basis for the two following acts, namely, the Smith-Lever and the Smith-Hughes Acts. For it was found, during the next 50 years, that the experiment stations were accumulating a large amount of information that was not reaching the farmers, and that the agricultural colleges were not educating any large body of men who were going back to the farms to apply the information gained. The colleges of agriculture were able, mainly, to supply the professional classes of teachers and research workers in this country and abroad, and a limited number of leaders in agricultural affairs.

In order to diffuse the practical information gained by research work in the United States Department of Agriculture and the State experiment stations, the Smith-Lever Act was passed in 1914. This act reflected the development of thought in home economics, by providing for extension work directed toward the improvement of the rural home. In order to secure, in a measure, an extension of the Land-Grant Act, the Smith-Hughes Act was passed in 1917. This act made provisions for a course of systematic instruction in agriculture and home economics, to be carried on in schools and classes, for those over 14 years of age who so desire, under a definite plan of cooperation between the State board for vocational education and the Federal Board for Vocational Education. The "home project" is the supervised home work, directly related to the classroom work, provided under the act.

Boys' and girls' club work is a part of the agricultural extension system which reaches every part of the United States. This system has been organized by the United States Department of Agriculture in cooperation with the land-grant colleges and county extension organizations, in accordance with the provisions of the Smith-Lever Act of 1914 and other acts of

Congress and State legislatures authorizing the establishment of such work and making appropriations for it. Demonstrations on the farm, in the home, and in the community, by men, women, boys, and girls, constitute the main medium through which this work is done. The work is backed by the research system of the State agricultural colleges and the United States Department of Agriculture, which employ a large number of research workers and extension specialists. It brings directly to the farmers and home makers the new information which is deemed practical and useful. In order that this information may meet the needs of the farmers and home makers adequately, there are county extension organizations composed of all those who are interested in better farming and home making in the county. There are also employed to work with these county extension organizations, one or more county extension agents, representing jointly the State college of agriculture, the United States Department of Agriculture, and the county. There may be a county agricultural agent, a county home demonstration agent, and a county club agent. A county extension organization with the help of these agents determines what are the problems of the farm and home in the communities and in the county, the best way of meeting the problems, and who of its members shall lead in doing this work. Such a plan, when drawn up, is known as a "self-determined program of work." The members of the county extension organization, through their delegated committeemen find a solution, or part solution, to each difficulty by carrying out suitable demonstrations with men, women, boys and girls. Everyone in the community is considered a possible demonstrator, regardless of his age, experience, or education. The demonstrations to be undertaken presuppose investigation and available information concerning the best practices.

That the development of extension work with boys and girls was contemplated by the act is clearly shown by the following statement of the Hon. A. F. Lever, then chairman of the committee on agriculture of the House of Representatives, in presenting the purpose of the bill to the House:

"If the rural life is to be readjusted and agriculture dignified as a profession, as it should be, the country boys and girls must be made to know in the most positive way that successful agriculture requires as much brains as does any other occupation of life. \* \* \* The farm boy and girl can be taught that agriculture is the oldest and most dignified of the professions, and with equal attention and ability can be made as successful in dollars and cents, to say nothing of real happiness, as any of the other professions. Your committee believes that one of the main features of this bill is that it is so flexible as to provide for the inauguration of a system of itinerant teaching for boys and girls."

On another occasion, Mr. Lever further expressed his views concerning the act as follows:

"\* \* \* My efforts to secure the passage of the Smith-Lever Act \* \* \* had the most encouragement from the achievements of the members of the corn and tomato clubs, and I hope sincerely that a large share of this money will be devoted to an expansion of the work with young folks."

In boys' and girls' club work, it is the aim to use only those boys and girls who are competent to carry a demonstration through to completion successfully. In this way, boys' and girls' club work has proven to be an important agency not only in introducing but in securing a wider use of



practical information in agriculture and home making, in response to the needs as expressed by the community itself in its program of work. By conducting a particular phase of the farm or home business and putting into practical operation the methods which have been found to be most desirable, boys and girls are enabled to raise standards in the community in a single year.

That boys' and girls' club work has been an effective extension agency cannot be disputed. The splendid accomplishments of the corn club boys of the South in teaching better methods of growing corn is a striking illustration. The livestock industry is being stimulated and improved to a greater degree than ever before by the various livestock clubs, such as purebred pig clubs, and heifer clubs. Purebred stock introduced by the club members is being very generally used as a foundation for purebred herds. Often the purebred stock raised by club members is sold to neighboring farmers, materially spreading the influence of better stock throughout the community.

Reports show that the average yield per acre, during 1919, for potato club demonstrators, in 28 States of the North and West, all of whom followed definite recommended practices, was 168 bushels, while the average for the same States, for the same year, for all potato production was 93.46. The use of the records kept in such demonstrational work plays an important part in influencing a large number to adopt better farming methods.

Prof. R. A. Moore, corn extension specialist, University of Wisconsin, says he is convinced that Wisconsin's high corn yield of recent years, as compared with the yields in several other States, is due largely to the fact that Wisconsin club boys and girls for a number of years have been carefully planting high-grade seed and distributing it to farmers throughout the State.

It has been found that one of the community problems, in some sections of the country, is the poor quality of the home-made bread and the insufficient amount used. Consequently, demonstrations have been conducted in the homes of club members in the use of yeast, the bread-mixer, and improved methods of bread-making, and in various uses of bread. In Minnesota, during 1919, 250 bread club teams of 3 members each, representing 69 counties of the State, vied for local county and State honors, in giving public demonstrations. The demonstrations and the exhibits of the winning teams have become one of the strong educational features of extension work. In Massachusetts, where there is a large foreign population, it was found that many of the people were on a small wage and eating unwholesome bread. The problem was evident, but work with the adults proved futile. During the winter of 1919, a dozen bread clubs were organized and worked industriously. The effect was immediate. One fourteen year old girl alone made 16 loaves of bread weekly, and taught bread-making to the girls and women of eight other families.

A few years ago, canning in the average home was done on a small scale. Canning of vegetables and meats was practically unknown. As a direct result of canning club demonstrations, canning is now established as a practice in a majority of the homes in the United States, and in many places in Canada and abroad. Canning clubs have brought to the attention of the American public the far-reaching benefits accruing from home canning itself. They have introduced improved methods which have contributed

materially to ease in procedure. They have brought about the use of better canning equipment in the homes. They have induced thousands of housewives to use pressure cookers and other canners, and have increased the demand for improved tin can sealers, glass jars, and rubber rings. In brief, home canning, as a result of the canning club work, has won for itself a distinct place among the few permanent home industries.

To illustrate how boys' and girls' club work meets the needs of the community we have only to point to the great increase in the number of canning club demonstrations during the war, and the subsequent decrease after the war, when the need for demonstrating canning did not seem so great. It will also be noted that with the decrease of canning demonstrations, there was an increase in the number of clothing club demonstrations, due to the high price of ready-made clothing.

During the past two years there has been a large number of clothing club girls concerned in making garments at home, in learning short cuts in sewing, and in exercising economy and care in the management of the clothing which they already have. Where the work has been under way for some time, there have been several interesting results showing its value from the standpoint of the demonstrations, namely, an improvement in quality of materials and style of dress of country boys and girls, an increased self-respect on the part of the country boys and girls because of improved quality of garments worn, a change in the character of materials handled by the country store, and an increased appreciation of clothes on the part of those making them which has led to better care.

The cooking clubs in many communities have been successful in demonstrating the preparation of canned food products, of better planned and prepared meals, and in introducing hot lunches into the schools. A State club leader writes: "The cooking clubs have functioned during the past winter through the serving of hot dishes at the noon hour in the rural schools. In this club activity, the value of milk used in the preparation of soup and cocoa has been strongly emphasized. In several instances, the work of the cooking clubs has led to the establishment of permanent hot school lunch facilities in the rural districts."

It has been the custom of farmers for many years to invest the profits accruing from the land in buying more land. Due to the high price of land during the past year and the scarcity of labor together with the steady migration of our boys and girls to the city, it has been pointed out by economists that it was an opportune time for the farmer to invest at least a part of his profits in making the farm home more attractive and comfortable. Along with this economic condition, it has been interesting to club leaders to note the increased number of club girls who are using the money earned in other club activities to make their own rooms, and their homes in general, more pleasing and convenient. There has been a rather unprecedented demand for help in planning and selecting home furnishings, refinishing furniture, floors and walls, and in making furnishings of various types. It has been found that such work creates a desire among the girls and their mothers, and often their fathers, to improve further the rural home, and shows the boys and girls in particular the possibilities for comfort that living on the farm can afford. One Alabama club girl became so interested in making her home more attractive that she entered into a contract with a nearby carpenter whereby he would accept as pay for

his work a definite number of her canning club products. Such initiative on the part of this club member led her father to make extensive improvements to their farm home.

A serious problem that confronts us, is the influx of our boys and girls into the cities from the farm. If we can, through such boys' and girls' club work, interest our boys and girls in their homes, leading them to remain on the farm, and show them that the work can be both profitable and enjoyable, then boys' and girls' club work has been indeed worthwhile in improving agriculture and home life from this one angle alone.

Through the medium of the demonstration, there are several other outstanding features of boys' and girls' club work that plays an important part in rural development. Scores of former club members have become community leaders in the county extension organization. In all extension work, it has been recognized that permanent progress toward better agriculture and home making is directly dependent upon the kind and amount of leadership developed. Boys' and girls' club work is a simple and efficient system for developing rural young people into such leaders. First, it interests boys and girls through a community program of work. Then it helps them to carry out the program. As has been noted, this results in their serving the community. The quality of service is raised by providing special means for giving publicity to the demonstrations conducted, and for encouraging and rewarding work well done; hence, the club records, reports and stories, the various contests, such as the public demonstration team contest, judging contests, and those provided through exhibits, the club festivals, club hikes, club tours when each observes the work of all the other members, achievement day meetings when a premium is placed on the successfully completed demonstration, and the club charters given to those clubs who meet the requirements of a standard club.

Of much importance are the direct benefits the members derive from carrying to completion the demonstrations undertaken voluntarily. The interest gained from becoming a demonstrator in some club activity has led thousands of boys and girls to take systematic instruction in agriculture and home making in secondary schools and colleges, often paying their own way with money earned through this club work. During the past year, 23 States of the North and West reported that there were attending the State agricultural colleges 989 former club boys taking the agricultural courses and 607 former club girls taking the home economics courses. In the South, 2,274 girls were reported as having attended normal schools or colleges with money earned through their club work. In addition, club work gives boys and girls an experience that will be valuable in any vocation. The organized club group has developed among the young people of the rural districts, initiative, vision, leadership, and a community consciousness which is very essential to the future life of this nation. When boys and girls come together voluntarily in an organized manner to consider ways and means for carrying on constructive work and when these various considerations are interwoven with free, wholesome play, a process in community development is taking place that assures a happier, more permanent rural people.

In considering boys' and girls' club work in its relation to the Smith-Hughes home project work, it should be remembered that the acts providing for both of these lines of work were passed by the same Congress, with

practically the same personnel, and introduced by the some committee, and that the Secretary of Agriculture is a member of the Federal vocational board. Therefore, it seems safe to assume that in the minds of those men of judgment and vision, who provided for both of these lines of work, each had a definite purpose, distinct from that of the other.

Moreover, the leaders of both of these lines of work are in accord in believing that each line of work needs the reinforcement that the other can give. Boys' and girls' club work in its contact with the young people in the rural communities, as has already been noted, aims to show them by participation in certain practical enterprises that the farming business of their parents is worth while as a career and that in order to follow it most successfully and with the greatest satisfaction, they should get a broad training for it in school or college. The Smith-Hughes Act, in turn, makes provision for such young people. Through boys' and girls' club work, by means of the demonstration which provides a "do" program of work with a minimum of theory, boys and girls are given an experience which enables them to understand, appreciate, and profit by the systematic courses of instruction in agriculture and home making which they may later elect in the Smith-Hughes schools and classes.

Through both lines of work, farming and home making are improved. But the means to this common end are quite different. As has been stated, the Smith-Lever Act is concerned with the immediate improvement of agriculture and home making through diffusing useful and practical information, mainly by means of demonstrations which may be undertaken by the boys and girls. The Smith-Hughes Act, on the other hand, provides for rural improvement by giving rural boys and girls, who so elect, the "tools" whereby they may become successful farmers and home makers of the future.

Boys' and girls' club work is not organized around a systematic classroom course of instruction, as is the home project. It is wholly an extension agency to aid in solving the present problems of the rural communities of our country. It mobilizes the skill of the community in extending its information. It mobilizes all boys and girls of the community who volunteer to take part in the demonstrations and can carry them through to completion.

If we recognize the two broad principles underlying the Smith-Lever and Smith-Hughes Acts, there is no reason for alarm if, perchance, the demonstrations of the boys' and girls' clubs and the home project work in some localities may be found to be similar. However, it should be recognized that each line of work renders a service distinct from that of the other to the boys and girls and to the communities.

The methods of work called for under the provisions of the Smith-Lever Act are so different from those required under the Smith-Hughes Act, that there can be little opportunity for much duplication, if each worker understands his own job. True, there will be confusion at times (in the mind of the layman) because new workers are constantly being employed who do not understand. However, the greatest cooperation that can be asked from either group of workers is that each believe sincerely in the work of the other and heartily endorse it.

Smith-Hughes home project work was discussed by Miss Genevieve Fisher, Federal Board for Vocational Education, as follows:

**THE HOME PROJECT—A METHOD OF INSTRUCTION IN A VOCATIONAL COURSE  
IN HOME ECONOMICS**

**BY GENEVIEVE FISHER**

Miss Warren has clearly set before you the splendid program for the boys' and girls' club work. She has pointed out how it utilizes the group spirit so strong in the adolescent boy and girl, to contribute to a community program. She has further shown that it is not organized around a piece of definite instruction, but grows rather spontaneously out of an immediate need. It is the purpose of this paper to show that there is a place for the home project as a method of instruction in a home-making course, but that it should be a part of an organized course of instruction. Also, that, although there will be occasional group projects, the work as a whole will be individual, aiming to give information and develop both manipulative and managerial skill through contact with actual home-making experience.

For the past two decades, the idea that the school should be not merely a preparation for life, but life itself, has been steadily gaining favor in the educational world. Educators are finding that knowledge is best gained through the solving of real problems—such problems as the student finds needs for in his every-day world of affairs. Along with this conception of the function of learning has developed a method of teaching—the method which uses for its tool the purposeful act—the project. This method is finding acceptance in practically every field of instruction, but possibly the heartiest reception from those in vocational education, for vocational education maintains that training for a vocation is best carried on through contact with the vocation for which training is being given. It may be carried on by the individual, or by a group, but it must be performed whether in the school, on the farm, in the home, or in the shop where a contact with the vocation can be made. This essential was so generally accepted at the time of the passage of the Vocational Education Act by those interested in the teaching of agriculture that the following clause was included: "That such schools (schools offering vocational agriculture) shall provide for directed supervised practice in agriculture either on a farm provided by the school, or other farm, for at least six months per year."

Does training for home making also need contact with the vocation to make it vital, to make it function in the lives of the future home makers? We think it does, and we think the supervised home project offers that opportunity which will give experience in a real home under normal conditions. That this belief is growing is evidenced by the requirement of home projects in home economics in five States, and the recommendation in many more States that the project work be a part of the vocational course.

What are the essentials of a project in home making? First, that it shall be a purposeful activity; one for which the girl feels an interest and which challenges her efforts, whether it be preparing supper for the family, caring for the family mending, making the clothes for a younger child, refurnishing her own bed-room, or a larger unit offering greater opportunities for developing managerial ability.

A second essential of a home project is that it shall offer experience in home-making activities under as nearly normal conditions as possible. If the student comes from a home where the strictest economy and wisest expenditure is necessary in order that her family shall have the necessary milk, vegetables, and cereals in its diet, her training should fit her to meet this problem. Workers in nutritional clinics are constantly telling us of incident which go to prove that much of our classroom instruction has not carried over into the homes. Perhaps we have trained for a theoretical home, not the actual homes of the girls in the group. We may have been guilty of teaching the planning, preparing, and serving of a course dinner to girls from homes where the one dish has to satisfy the hungry family, and where dessert is a Sunday treat. When the student's own problem becomes the center of departure—when she feels the responsibility of planning and carrying through to completion a definite piece of home work—we get a sustained interest which is sure to result in the acquisition of new knowledge and skill and an increased ability to carry on independent work.

For most home projects the girl's own home will best afford these opportunities. There are situations, however, where it may be advisable to have work done in the homes of others. Some homes will not have younger children to care for, but any neighborhood will afford opportunity for child care projects. Furthermore, employment in another's home gives an added impetus to the work, for there is a keener sense of responsibility when the standards of some one not in the immediate home circle must be met. Busy mothers and housewives of the neighborhood welcome the help that such work gives to them, and are willing to pay a fair return for such services. It is even conceivable that for a student living in limited quarters, or perhaps boarding, suitable projects could be devised for her to carry on in the school. Such cases, however, would be the exceptions. Real homes will be the rule.

A third essential demands that there be the closest correlation between the home project and the classroom instruction. The class hour gives the opportunity to report progress, raise questions, compare and check results, and plan procedure. The teacher is the advisor and guide, not the dispenser of information. She succeeds to the degree she gets the girl to assume responsibility and seek further information. This will naturally lead to the fields of related science and art. To be able to intelligently care for food she must secure facts from chemistry, physics and bacteriology. To provide the most suitable clothing for herself or some other member of her family she must know textile values and their relation to health, as well as suitability of line, color, design and fabric. The project furnishes the core around which such instruction can be grouped.

With these three essentials in mind, namely, that a home project must be a purposeful activity, challenging the girl's effort; that it shall be conducted under normal home conditions; and that there shall be an intimate connection between it and classroom instruction—let us inquire into the advantages of such a method of instruction.

The choice of the project is made after due consideration of the ability of the student, her previous training, her vocational interests, and the possibilities of the environment in which the project is to be carried on. The necessity for a working plan helps the girl to define her problem, see the

goal, and in a measure anticipate the steps necessary for its accomplishment. In other words, it demands that she think through her problem. It furnishes an enlarged opportunity for independent work in a natural setting. As new problems arise, the student goes back to the classroom, the library, or the laboratory, for a purpose. Here the skillful teacher guides, but does not inform. How different from the much used question-and-answer recitation, or the lecture where information is doled out with the hope that it may be applied when needed! The project method does not foster canned knowledge. This method provides for individual differences in speed of learning. The student sets her own pace, and efficiency, rather than time, becomes the constant in measuring her progress.

The success of the home project method of instruction is dependent not only upon a teacher adequately trained, with sufficient time for supervision, but also upon the cooperation secured from the home. One of our States has well expressed this in a triangle, representing the home, the school, and the girl, which heads the home project agreement card. I am reminded of a story told me by one of the State supervisors of a middle Western State. The school board of one of its fair-sized towns was faced with salary increases, maintenance increases, building shortage—in fact, the common experience of practically all school boards of the past few years. It had decided that some things must go. The home economics department was expensive to maintain. After all, what did it give to the girls that they were not getting at home? The case looked bad for home economics. About this time home project work was inaugurated and the cooperation of the mothers was enlisted. The neighborhoods began to buzz with the new idea. Fortunately for home economics, the daughter of one of the members of the school board was in the class. Well, to make a long story short, the enthusiasm of the daughter over her home problem interested the father, and home economics was saved for that town.

Not only does this cooperation with the homes strengthen the student's work, but it enables the teacher, through contact with the homes, to gain a point of view impossible to get within the four walls of the classroom. I am not so sure, but experience may show that this last point will have a far-reaching and perhaps revolutionary effect upon our future vocational courses in home economics. May we not hope that this intimate contact with the home will give the teacher the needed check upon her own teaching? May it not lead to a better understanding of the actual needs of different groups, and result in a wiser selection of subject matter?

I am aware that some are already asking themselves: But can this method of instruction be used in the ordinary day vocational school, especially that type which is a department in a high school? Not without changes. The home project method necessitates a limited group of students. Experience leads us to set 15 to 20 as the maximum. It requires a flexible school program which will permit both teacher and pupils to be out of the classroom if the project makes it advisable. Sufficient time must be allowed for adequate supervision. To be sure, such a program is a bit upsetting to the academically minded school superintendent. But if we believe that through the home project method we can better train our future home makers, will we not find a way? Some already have.

## TRAINING OF TEACHERS FOR HOME PROJECT WORK

Perhaps the three most important factors in the success of the home project method are:

- (a) Cooperation with the homes.
- (b) Adequate supervision.
- (c) A teacher who believes heartily in the value of this method and is trained to carry on the home work.

It is perfectly possible, even with full cooperation of the homes and adequate time for supervision, to have the work fail, if the teacher bungles. On the other hand, given a trained teacher who believes in this method of instruction, it is more than likely that both cooperations of the homes and time for supervision will be secured. Granted, then, that the teacher is probably the greatest factor in the success or failure of home project work, it would seem that her training should prepare her for this method of instruction.

Perhaps it is something of a digression from the subject assigned, if I touch on the teacher-training problem, but I cannot resist when tempted by an audience of home economics women from the institutions which are most largely responsible for training vocational teachers of home making.

Engineering and agricultural colleges are fast appreciating that technical work can best be taught when opportunity for application parallels class instruction. Home economics departments have added practice houses and in some instances are extending the work into the students' homes through the summer vacations. This is all most excellent preparation for training the prospective teacher, for observation leads us to believe that the young teacher will tend to teach as she has been taught, rather than as she has been taught to teach. In addition to this, however, she should get definite, specific training for project work in the special methods course and have an opportunity to put this training into practice under supervision before she has completed her training. This training should include the analysis of subject matter to discover what material lends itself best to the project method of instruction, and the making of project outlines, including an abundance of reference material which can be furnished to the pupils as guides in planning their individual projects. She should have instruction in the best ways of securing cooperation of both the school authorities and the homes. She should be guided in her conferences with the pupils and the inspection of their home work in her supervised teaching. She should be taught what to expect in the form of working plans and final reports from the pupils. In short, a teacher trained for vocational home economics education must know how to use the home project method of instruction efficiently. We are looking to the home economics departments of the land-grant colleges for such teachers.

MISS NANCY H. McNEAL, Cornell University. I am going to tell you briefly about our New York State program for the girls' club work.

First as to aims. I can see no difference between the aims and principles in home project work, whether it is in New York State or some other State, or whether it is club work or a phase of the Smith-Hughes vocational course.

We must agree with Miss Fisher that we must surely provide experi-



ence in a vocation if we train for it effectively and that any successful home project must be an activity challenging the students' efforts and must be carried on under normal conditions.

As to methods, it is plain that in club work we must depend almost entirely upon the home project as a method of teaching more than is necessary in a high school course. We have not a trained teacher to operate the program, no special laboratory, and limited class instruction. However, it would, in my opinion, be difficult to overwork or overemphasize the value of the home project method. Perhaps ideally, in club work we would not have less of the home project method but more efficiently trained leadership.

As to content of program, I, personally, believe that we should not undertake as ambitious a program in club work as can be successfully operated on a school basis. I may change my mind about this in time, but so far in New York State, our program, which is really working, is not as comprehensive as the usual school program, and I am pretty well satisfied to have it so. The main thing to accomplish, first at least, is to make a program really work. Our plan for making our program work has been our problem. It is comparatively easy to write letters and circulars and bulletins and mail them out to rural teachers, or other local leaders, and hope that somehow they will be carried out, but to put the program into the field and follow it up and prove that it does work, is more difficult. This is our plan in New York State:

First. To have a county leader of club work, finally to have two—one trained in home economics, as well as one trained in agriculture.

Second. To help the county leader to secure local leaders for clubs of girls who wish to undertake a "project" after hearing the program outlined and described.

Third. To help these local leaders to carry out the program.

I am especially concerned with the last point. I, as a subject-matter specialist, hold the training classes for local leaders. This is done for the first time as early as possible after the clubs are organized, which is usually in the fall months, and after that two or three times during the year or term through which the club work is being done. The county leader of junior extension arranges for these meetings.

In these classes the general program of work is explained, and the directions reviewed, charts and posters are displayed, and demonstrations are given (preferably with a group of girls in the presence of the leaders) of the important steps and processes. In the foods work, e. g., in the fall season when milk is the subject, demonstrations of the selection, preparation and serving of a hot dish for the school lunch or of a simple meal including milk dishes are given.

In clothing classes, demonstrations are given, for example, of the selection of material, cutting and making of a simple kimono garment or the use of one pattern for several garments and the use of the sewing machine.

In the last class of the season emphasis is put on the team demonstration work. A club is encouraged to divide itself into teams and practice some favorite demonstration. Outlines which are sufficiently definite to give a clear idea of such work are provided. These are always more or less modified by the leaders and the girls.

It is expected that some team from every club may do some public demonstration work at school, community or county fairs. This training has numerous advantages, first in training the girls themselves in organization, team work, public speaking, etc. Then it is one of the best ways of showing the community what the work is. We are more and more impressed with the value of team demonstration work as an effective teaching method.

We have put great emphasis on illustrative material in the form of charts, posters and garments—all of this as a means of helping the local leader to understand the program, to become intensely interested in it, and to believe that she can hold the girls and make it work by following these suggestions. This is, of course, the teacher-training end of club work.

We surely have many of the same problems in club work and in the vocational home project work. The aims are the same. As to differences, I see the content of the program slightly different and the machinery for putting the program into operation quite different, with advantages on the side of the vocational work surely—but some, too, on the side of club work, the spirit of the volunteer and a persistency in leadership training born of necessity.

WEDNESDAY AFTERNOON, OCTOBER 20, 1920

The first paper was presented by Miss Margaret Sawyer, American Red Cross, as follows:

#### COOPERATION BETWEEN THE HOME ECONOMICS EXTENSION PROGRAM AND THE PUBLIC HEALTH NURSE

BY MARGARET SAWYER

Public health nursing has as its object the saving of life, the upbuilding of family health, and the promotion of community sanitation and hygiene. It deals with individuals and families in its efforts to restore the sick to health, to find and correct physical imperfections, to teach the practice of healthful living and establish sound physical and mental habits. It deals with the community in its efforts to assist in checking and eliminating communicable and preventable diseases, in discovering and correcting insanitary conditions, and in educating the community in physical hygiene and public sanitation.

In order to achieve these objectives a number of projects must be developed. It is impossible to reach the goal through any one of these projects alone. All are necessary in a complete program. Seldom, however, is a public health nurse able to carry on all of them. Usually, when working alone in a large territory, she confines herself to the development of one or two of the following public health nursing activities, the choice being determined by the needs and desires of those she serves, and very often by the possibility of accomplishment.

*Bedside nursing* consists of actual nursing care given to sick patients in their homes. Such care is given to both sexes, all ages, all nationalities, and in all varieties of illness, except in the contagious diseases. It is arranged on the visit basis, the nurse calling at the home to give the necessary care, daily or as often as needed, but not remaining in the home, except in emergencies. Her care is not confined to the sick patient in the

home. Her concern is the health of the entire family, and she endeavors to discover and remedy physical defects and habits, as well as insanitary home conditions which are productive of disease. She gives the family definite instructions as to how to keep well, and how to care for simple cases of illness.

*Prenatal nursing* includes supervision of the physical condition of pregnant women and instruction in the hygiene of pregnancy; advice in regard to injurious economic or social circumstances; arrangements for care during confinement; and the development of prenatal clinics.

*Maternity nursing.* There is a great deal of inadequate care of maternity cases, but the public health nurse usually is able to give nursing care only after confinement, as attendance during the delivery interferes seriously with the execution of her regular duties. If, however, her other work will permit her to be in attendance during the confinement and to rest during the day when she has been out at night, these cases should by all means be undertaken.

*Infant welfare* includes advice to mothers in infant hygiene; constant oversight of the health of the babies; development of infant welfare clinics and mothers' classes; and investigation of local conditions influencing morbidity and mortality.

*Child welfare* work is the extension of the infant welfare program to include children of pre-school age. It is beginning to include nutritional and growth clinics.

*School nursing* consists of assisting the medical inspector in the physical examination of school children; visiting the children's parents to secure their cooperation in remedying defects through private physicians, clinics, or hospital care; investigating the sanitary conditions of school buildings; instructing the children through health talks and drills in schools; developing health leagues, classes in hygiene, and little mothers' clubs among the boys and girls; and stimulating the teachers and mothers in the establishment of the hot school lunch.

*Tuberculosis work* consists in constant seeking of undiscovered or hidden cases of tuberculosis; giving nursing care when needed; securing medical and hospital care; teaching the family preventive measures; securing medical examination for the family and others exposed to infection; carrying on of an educational campaign; and stimulating the use of open-air classrooms.

*Communicable disease* control and sanitation consists of assisting the health officer to discover the presence of communicable disease and to declare and maintain quarantine; of instructing the family in methods of isolation and prophylaxis and in the care of patients; of assisting with vaccinations, the giving of anti-toxins and serums, and the taking of cultures; and of reporting insanitary conditions.

*Health education of the community.* The public health nurse endeavors to arouse the community conscience by lectures in physical and mental health, personal and community hygiene and sanitation, to groups such as parent teachers' associations, women's clubs, normal schools, churches, farm bureaus, etc., by exhibits and demonstrations at county fairs and whatever large groups are gathered together; by stimulating and cooperating in health campaigns and surveys, baby weeks, clean-up weeks, swat-the-fly campaigns, etc.

Although the average public health nurse does not make mental hygiene work one of her projects, she is concerned with it as incidental to her other projects.

All of these activities, no matter what the point of departure, whether school, clinic, health office, or health center, are directed toward the home and family, and all have as their object the saving of individual lives, and the physical improvement of the human stock.

In all except two States, there is a State supervising nurse who is responsible for the supervision of the public health nurses operating in the State. In 11 States she is the board of health's own appointee, paid wholly by it, but supervising also the public health nursing service of the Red Cross. In other States she is paid wholly, or in part, by the Red Cross, but supervising also the public health nursing activities of the State board of health. In a few States there are both a Red Cross State supervising nurse and a State board of health supervising nurse working side by side, each supervising the public health nursing activities of her own organization. In some instances, the State tuberculosis associations share in these agreements. In all these forms of cooperation, the Red Cross is always working toward the assumption by the State of its natural function in the direction of public health nursing activities.

As public health nursing in general had its beginning and rapid development in the cities, the Red Cross has chosen the neglected rural field for its efforts. For this reason, nearly all of their 900 public health nurses are working in rural communities. Public health nursing services are found in every State in the Union, sparsely scattered in the West and South, but nearer together in the East, North, and Middle West. It is, therefore, the Red Cross public health nurse that the home demonstration agent most frequently meets in the field.

In order to have complete and intelligent cooperation it is imperative that the State leaders of extension and the State supervising nurses confer with each other as to their respective programs, the projects entertained in common by both services, and the function of each in regard to carrying out these projects, with the view to making the work of each supplementary and not competitive to the other. They can cooperate further by conferring with regard to communities whose needs can be jointly met by the two services. An exchange of itineraries between the State leaders and the State supervising nurses might enable the two to meet frequently in the field. In addition to the exchange of itineraries there might well be an exchange of invitations to State and regional meetings. The more closely each service is in touch with the development of the other's program the more effective will be the work.

If State contacts have been made the local problems can be met more effectively. First let us consider the community that is so fortunate as to be served by both a home demonstration agent and a public health nurse. At the outset, we will assume that both are carrying on an educational program and are concerned ultimately with the home. The nurse, concerned primarily with the health of the home, is a specialist in this field. The home demonstration agent goes into the community not as a specialist but as the director of the home demonstration, which may vary from the demonstration of the making and value of dress forms to the care and feeding of children.

Thus, if cooperation is to be maintained in such a community, the home demonstration agent and the public health nurse must plan and carry out their educational and practical programs together. With the public health nurse taking the lead in the field of health and the home demonstration agent in the economics of the home, one will necessarily touch the other's specialty, but the contact should be merely a service to each subject.

There are projects which each will carry on quite independently of the other, and about which there will be no misunderstanding. The home demonstration agent may remain supreme in the fields of gardening, clothing, household management, home-planning, poultry, and food preservation. The public health nurse enjoys the same privileges in the realms of bedside, prenatal, maternity, and school nursing, tuberculosis work, and communicable disease control.

There is a common field in which both are working and in which both must continue to work if the maximum results are to be obtained. They approach the home and community from different points of view and each makes an invaluable contribution. If any nutrition work is being carried on among the children, the knowledge of both agents is needed. The home demonstration agent should be responsible for the food subject matter and for carrying this information to the mothers, the nurse for organizing the classes, helping with the physical examinations, and the correction of any defects which are found.

In establishing the hot school lunch both will need to demonstrate the need and create the desire for it. The home demonstration agent should take the initiative in getting the necessary equipment and instructing the teacher in the conduct of it. If it is to be most successful there must be some kind of follow-up work, such as weighing and measuring of the children, and the subsequent discovery of cases for the nutrition classes.

The activities of both the nurse and the home demonstration agent carry them into the homes of the communities. Here the nurse may discover that there is great need for an economic adjustment, in which case she should turn this over to the home demonstration agent. Likewise, the home demonstration agent will discover cases which seem to need medical attention, nursing care, or the correction of defects. The nurse should be immediately notified.

If the nurse finds that the women of a community wish instruction in food selection or related subjects, she should put this group in touch with the home demonstration agent rather than assume the responsibility herself. The same would hold true if the home demonstration agent finds a group of women needing instruction in home nursing.

I have been speaking about the communities in which there are both agents. In the communities in which there is one or the other, this common field will have to be carried on as adequately as possible by the one on the ground. In some cases it will be done very poorly, in others well. Nevertheless, this agent who serves alone must meet the needs of the community, and upon the specialist rests the responsibility of helping that nurse or home demonstration agent give the most authentic information we have to that community. Just the kind of assistance, to which I refer, is being given to public health nurses of New Jersey. A nutrition program for the State of New Jersey is being mapped out by the extension service of New Jersey. It concludes a course in nutrition for the public health nurses

already in the field, assisting them in organizing nutrition classes among the undernourished children, and supervising the same. Similar cooperation programs are being carried on in other States.

When the home demonstration agent does have to enter the nurse's domain, or the nurse has to help solve the problems of nutrition and other problems relative to the economics of the home, she must not go as a specialist, with the idea of developing the work, but as an emergency worker looking to the time when the specialist's services may be obtained.

A second paper on this topic was presented by Miss Treva E. Kauffman, University of the State of New York, formerly of Ohio State University, as follows:

#### COOPERATION BETWEEN HOME ECONOMICS EXTENSION AND PUBLIC OR PRIVATE SCHOOLS

BY TREVA E. KAUFFMAN

In developing and organizing any kind of project in home economics in cooperation with public or private schools, it is absolutely essential to first obtain the interest and cooperation of the persons charged with the duty of administration of the schools. This approach, as will be readily seen, is essential, in order to be properly admitted to the school and gain the interest and help of the teachers who carry out the work.

A statement sent out by the State commissioner or superintendent of public schools, or president or Bishop of private schools, setting forth the principles and the value of the project and requesting teachers to cooperate in developing the work in the schools is infinitely valuable in attacking the problem.

I believe that no matter what the project be, it should first be organized on an educational basis, in order to fit into the school program, and secondarily it should meet the social and community need.

Ohio's experience in developing some of these policies may be helpful in other States. Ohio was fortunate, in 1914, to have her legislature pass a new school code which made it possible to have county and district supervision of rural schools, county normal schools for training rural school teachers, and centralization of school districts.

At the request of the State Superintendent of Public Instruction, the home economics extension division was asked to cooperate in a plan to present home economics to the county normal schools. Prior to this the extension division of the college had been in existence for some years. However, the home economics work was confined to that of conducting extension schools for women and giving talks and demonstrations to women's clubs. The only work with the schools was that of judging and promoting school exhibits. Since approximately 50 of these normal schools were to be organized in the State, consisting of an average of 15 students who were to be given one year of training for rural school teaching, the opportunity was a splendid one for introducing some home economics teaching.

A week's work on home economics was presented at each school by extension specialists. The subject matter presented was a general viewpoint on home economics and more intensive presentation of the subject of food, with the thought that this would lay a foundation for developing the

school lunch work. The following year an extension specialist was given the problem of developing the school lunch in the schools. Work was first started in several schools where teachers had been students of the normal class and with some other teachers not graduates of the normal schools. These schools selected were one room with an average of 15 to 25 pupils. The work was developed by presenting and correlating food principles and facts with the subject matter already taught in the school and making the practical demonstration through the preparation of a hot dish to supplement the cold lunch from home.

From this the work grew into the serving of lunches in the centralized school, and this presented a means of introducing some teaching on foods as well as of meeting the needs of school children through the school lunch.

Lessons and bulletins were prepared from this experience and sent to teachers to follow in developing the work. This specialist from then on devoted her entire time to developing the school lunch project throughout the State.

The plan used was as follows: Conferences were held with county and district superintendents and visits were made to a number of schools in their respective counties. Talks and demonstrations were given in order to help the teachers in starting the work. A special exhibit showing the necessary equipment, also including posters showing the value of the work and pictures of actual lunches, were displayed and talks given at a number of teachers' institutes, conferences, and State and county fairs.

The county home demonstration agent was a great help in developing this project, as she could more closely supervise and work more intensively in her community.

The school lunch specialist with an assistant was given the opportunity to organize and develop girls' club work in the State and since both the projects were organized in the schools more efficient results were accomplished in the beginning.

The results accomplished in Ohio from this effort have been gratifying. At present, a school lunch specialist, another specialist in charge of the county normal school program, and an assistant State club leader of girls' clubs, all working together for these interests, best speak for themselves. What the school superintendents think of this cooperative work is expressed by one of the leading county superintendents in the State in urging "more and better cooperation of all school people with the extension division of the State university, in order to make education function in the community."

Our experience with the private schools has not been as extensive as with the public schools. However, one city home demonstration agent, with the help of the school lunch specialist, was able to introduce school lunches into both a parochial and a private non-sectarian school. The policies followed were the same as have been given for the public school. From the results of a survey conducted in one of the large cities of Ohio it was shown that the parochial schools had developed practically nothing in the lines of home economics teaching, but the Father in charge was interested and asked the services of the home economics department of the college to present plans for introducing this into the schools. Their present difficulties are lack of funds and an overcrowded curriculum.

The plan for conducting the junior home project work as used in New York State possibly represents the best organized plan of any State. There

are the two cooperative agencies, namely, the State Department of Education and the State College of Agriculture.

The function of the State Department of Education is to administer the educational activities, or work out the plan for the organization, while the State College of Agriculture is to furnish subject matter. Therefore, at the State department the State supervisor of junior project work administers all organization of the work, while at the State College of Agriculture, the State leader and assistant leader of boys' and girls' club work help with this organization and furnish the subject matter. "A definite plan of cooperation in counties has been prepared by the representatives of the two institutions. This plan recognizes the interest of the two institutions in the work and offers suggestions for cooperating in organizing and carrying it forward in counties. In practice, therefore, the representative of either cooperating institution may be called upon to assist in organizing and conducting the work."

As I see it, projects as needed at present, and those being carried on, are the school lunch, the nutrition class or child welfare project, the junior home project or girls' club project. The school lunch and junior or girls' club projects are a means of introducing and presenting home economics as a subject into schools not giving such instruction. Where the subject has already found its way into the school, the school lunch and nutrition class afford an opportunity for the classes to work out practical problems and make home economics teaching function. The junior or girls' club project if developed in schools where home economics is taught affords an opportunity for carrying on more advanced home economics work through the summer months and develops team work and a competitive spirit among the girls.

I also believe that even though the States have State supervisors of home economics, and more extensive work is developed along this line in the schools, there is still a great need for this cooperation and help from the extension division of the college, not only in supplying subject matter, but in developing organization. There should be the best cooperation possible between State supervisors of home economics and leaders of extension projects in order that there will be no duplication of work. The field is too fertile and the workers too few to permit such a waste of effort. As I see it, where we have competent teachers of home economics carrying on, for 10 or 12 months of the year, work in the schools, there is no need of organizing these same girls, already taking home economics and home project work in the school, into junior project work or girls' clubs. The efforts of the teacher, in cooperation with the leader of extension projects, should be given over to the developing of this type of work with the girls in the grades or high school, or those not enrolled in regular home economics work at school. However, some of the girls pursuing this work in the school may act as assistant leaders of these projects, thus giving them some training in leadership and cooperative team work.

As our colleges and universities are training more efficient teachers in home economics and acquainting them with these needs and our schools are more and more employing these teachers, we know that many of these projects will be, and are being, carried out by these teachers in their respective communities. However, their cooperation should always be sought and they should fully understand the State plan.



I firmly believe that in the future the efforts of the home economics specialist in her cooperative work with the school, in developing the projects discussed, will prove most useful in the schools without a home economics teacher.

I feel that the home economics specialist has been the pioneer worker in developing this field and opening up the way for introducing such teaching into the educational system, and as this becomes a part of the curriculum the extension specialist should rightly fit herself into this organization, and direct her efforts along other less developed lines.

A third paper on the subject was as follows:

#### COOPERATION BETWEEN HOME ECONOMICS EXTENSION AND COMMERCIAL PROJECTS

BY R. M. ALLEN<sup>1</sup>

The direct benefit to American civilization contributed by the agricultural colleges and experiment stations cannot be over stated. The agricultural chemists have built their monuments everywhere, in every State. Our knowledge of soils, of feeds and feeding, of foods, of chemistry as it applies to the everyday affairs of life, has had a large part of its beginning with the American agricultural chemist. Public health, pure food, medicine, applied science in industry, owe these and their co-workers, the biologists, heavy debt. They have been fact getters, fact followers. No class of men and women have held a higher place in the public confidence of their States. In the language of Emerson, they were "appointed by Almighty God to stand for a fact," once they have gotten the fact. Even in litigation their evidence is seldom challenged. Judge and jury, even opposing attorneys, respect their fairness and integrity as well as their ability.

The agricultural college has paid large dividends on the moneys invested in it. Long and well-confirmed research brought it to sound foundations in applied science. The scientific fact applied leads to change in the economic condition. The agricultural college has entered the field of applied economics. It has the method, the public confidence, its workers the non-partisan courage to furnish the engineers to bridge the gaps and gulfs of misunderstanding between production and manufacture, between organized industry and the public, to build the bridges that will bring the economic benefits of each to the other.

Your comparatively new work has inherited a tradition of public confidence in the agricultural college and experiment station. First in importance is that this confidence shall be preserved. The public get their medicine through doctors in whom they believe, their scientific facts, their facts about industry, if you will, through men and women in whom they believe. The public believe in you, and your cooperation with industry must be conducted so as not to cause public distrust.

It was logical, inevitable, that institutions of such profitable help to soils, to crops, orchards, and livestock would be called upon to bring help

<sup>1</sup> Manager, Research Products Department, Ward Baking Company, formerly Head, Kentucky Food and Drug Control.

to the domestic economy of the home, and that the task be turned over to women workers.

The home economics worker is interested in the product finished for use in the home. The government tells us that the women spend 90 percent of the average income, so that you are interested in a very large way, in a very varied way. You have many fields in which to gather the correct facts. The maker of cloth and clothes, of food and furniture, of everything that goes into the home will in the end come into cooperation or conflict with what you find and teach. The large majority of those who perform a service for the home want you to know the full truth, all of the essential facts about their processes, products, and profits. They want your suggestions; but they must have suggestions based on thorough investigation and full understanding, not upon experimental theory as to what should be, or not be done. The business organization is a very practical institution. It conducts research; frequently tries a new product out to see what the consumer thinks about it; but its everyday operations must comply with public demand. The man at the helm and his assistants must be well-balanced thinkers. Each change, each new step must be financed and placed on a basis of acceptable net earnings. This calls for full investigation on your part, for sound thinking, for constructive methods.

There have been pioneer days in industry, as well as in farming. Most of the American industries were financed out of the speculative risk. There have been uncertain days—days, years of risk. There have been coyotes, wolves, and cattle thieves, in all fields of the pioneer—farming, financing, transportation, and merchandising—and the public still has its suspicions, its periods of distrust. But gradually organized industry is being brought from a speculative to a definitely known return on the investment. Practices which once caused public distrust are either being regulated by law or being abandoned as bad business. Quality in the product and service to the public are becoming the business policy and the sales slogan.

The industrial leaders are more and more coming to see that the fact and courage behind it is the more potent, the more certain and permanent method for settlement of issues. Already many questions are being taken from the field of politics to the laboratories, or to settlement by sound economics. The method of political protection has caused every organized industry of national proportions to be more or less surrounded by a retinue of individuals, many of whom feel that their livelihood depends on never settling an issue.

"What are you doing with your problem?" an old acquaintance formerly in pure food work asked.

"It is settled," I answered.

"Settled? What will you do for a job?"

This man represents an interest whose product has been a controversial issue during the last twenty-five years among pure food departments, and is still unsettled.

Frequently the managements of industry have not understood and have not fully trusted the public. Once fooled, once trifled with, the public seldom, if ever, forgives. Men in public life know this. The public have trusted, for example, men like President Roosevelt, women like Jane Adams. Industrial managements are coming more and more to realize what this means when applied to their products and their services. "Good will" has

taken on a new and more powerful meaning, as applied not only to the brands but to the industries behind the brands. One of the most significant trends in industrial progress is the recognition of this among industrial leaders, and the wide interest and sincere effort in the establishment of a lasting good will among the public. There are no classes of our people who will be more productive of practical idealism during the next fifty years than the men and women engaged in the organized industries which serve the public. This has been evident during the last ten years of pure food control. Those now working in industrial organizations see the trend widening and deepening into fixed policy. Those of you whose work effects this building of good will can help by approaching every industry, every product, with fair methods, an open mind, a mind determined to get at all of the material facts.

This is the age of the machine. What are we going to do with the machine and its economic changes? So eminent a lawyer as Mr. James M. Beck, before the National Institute of Social Sciences, last winter, speaking of pioneer days, stated:

"They were men of a simple age, before machinery had in some respects cursed mankind, as I verily believe it has. Their fathers plowed the fields as their ancestors had done for centuries before them. It was before the age of the railroad, the steamship, and the telegraph. They had few ideas, but because they were few they knew what they knew well and they saw clearly."

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"We live in the age of machinery. That age of machinery has had, of course, infinite blessings. No one would dispute that, but it has had infinite evils; it is a Pandora's Box.

"So far as the manual toiler is concerned, I am deeply impressed with the fact that the underlying cause of the labor troubles that now threaten to engulf the world with anarchy, is the deadening of the soul of the manual toiler by the effect of machinery, that has robbed him of his pride of craft and his interest in his work. Han Sachs, the Nuremburg shoemaker, could sing his songs, could lead the democratic masses of the old city, and yet the joy of his life primarily was in making a finished shoe. He made it from beginning to end and, as Wagner shows in his opera, he not only made it, but fitted it to Eva's foot, and did a workmanlike job. But today the man who simply runs an impersonal machine that puts a thousand eyelets to a shoe in an hour, who does a perfectly deadening infinitesimal fragment of a piece of work, which involves no pride in artistry, no exercise of judgment, no skill or taste, nothing but the monotonous feeding in, hour after hour, of a given thing, the machinery doing the rest—that man's soul is necessarily deadened by boredom and the ennui of his existence.

"It is not merely the manual toiler that is being deadened by the age of machinery in the infinite diversifying of life. The specialization of human endeavor and the standardization of human life are also fatal to leadership in art, music, politics, or any high occupation."

This represents a type of thought among some of the workers in home economics. "Go back to the old household arts," has been preached in not a few classrooms.

Let us analyze for a moment Mr. Beck's philosophy: Where does national discontent come from? Does it come from the land of the machine, or from lands where absence of labor-saving inventions have kept the people in economic slavery? Contemplate our national solidarity as well as our national prosperity. To what is it due? Could it get along without the organized financial and industrial ties which link one coast to another,

which put the products of the inland west at once into equal competition in world markets? We have been, and still are, occupied with questions of the proper ownership of our national industrial facilities, but the big fact is that we have developed and have the organized and adequate facilities for our industrial opportunities, for any needed national mobilization of resources. How long would our national solidarity remain without modern methods of communication, travel, financial confidence, freedom of commerce, and facilities equal to its volume and distances?

Organized industry feeds, clothes, transports, and brings most of the necessities and comforts to the present-day civilization. The higher developments in our civilizations have been due, from the material side, to the freedom from the wash tub, the spinning wheel, the hand loom, the hand reaping cradle. One has but to compare the centered populations of the countries which do not have machinery with our people, to note how much this is true. Even the profession of domestic science is one of the expressions of this development, of this application to present-day problems of specialized knowledge through the teachings of the trained mind. But there is a gap between the managements of the organized industry and the public. The public accepts the service with too little of knowledge of the research, the steady plan, the applied thought, the earnest care which goes into the organization performing one of those daily needed, daily utilized forms of public service.

The home economics worker has a relation to industry in a broad way. The ultimate purpose of the machine, and the organization behind it, is to serve. Your interest lies in how to bring the consuming public into closer relations with the benefits offered by industrial enterprises. While the machine necessarily depends on specialization for its successful operation and its betterment from year to year, it has introduced shorter hours. The worker has more opportunity for self-betterment and self-broadening and has a higher wage than when the work was done by hand. Now, the influence of the home economics teacher can be directly brought to the betterment of the condition of workers in industrial organizations, through the betterment of their homes and home surroundings; in the same way, and to the same extent as has this influence been felt in the betterment of farm life and farm homes, including the family budget, correct knowledge of foods and economy, without sacrifice of nutritive value, in the making of the daily meal, knowledge about cloths and clothing, and all of the necessary supplies that come into the home. There is no reason, with your interest, with the library, lectures, and other facilities for education and pleasure, that the worker should become narrow-minded. Your teachings, to the extent that they are sound and practical, can be made a direct and important influence in this field. It is mentioned as a project, particularly for the home economics expert working in the industrial centers.

There is much of unrest due to men and women not knowing how to avail themselves of the advantages for better living. The method for helping, is that of example, convincing, gaining confidence, tactful leadership. The methods of the animal husbandryman in breeding and feeding cannot be applied to people. Thrift, family budgets, the development of the individual, better health, cleaner homes, better methods of housekeeping, the introduction of modern methods into the home, proper food and proper eating are matters for educational persuasion. General Gorgas, for exam-

ple, cleaned up the Panama Canal Zone. Where screens and sewers were needed he ordered them, and the Government furnished the materials, labor, and engineering skill. He determined the food supplies best suited for the mess kitchens. He vaccinated, sent the ill to hospitals. He wrote his sanitary code for the Zone, and had the power and money to enforce it. Now, the health officer of New York City, for further example, has a different job. He must first gain the assent of the public for the law, for the money, and his orders must go to the court and jury whenever an individual disagrees. And so results must come through the method of educational persuasion.

Some specific projects for cooperation with industrial managements, and with the laboratories—the very capable and advanced laboratories—which many of the large firms maintain for themselves and cooperate in maintaining for their associates, may be mentioned:

(a) *The study of foods and food values, including nutritive value and economy.* Take a pound loaf of bread, for example; it furnishes one-half of the carbohydrates, one-third of the protein, and a fifth of the mineral salts needed in the average diet of the adult. Bread is, and has been, the basic food in all times and in all countries. Let us make it the basis for building the diet. Let us study together the bakery, the materials, the method of mixing, the proper heat for baking, the proper methods for protecting the bread during delivery; follow it into the home. The wrapped loaf goes into the home to-day at 10 cents per pound, with enough nourishment in the pound for one-third to one-half of the daily food needs of the average individual. Now, how much meat, fruit, milk and milk products, poultry, eggs, fish, vegetables and fruits, and other foods are necessary and are most economical, from month to month, to supplement, to build up on the pound loaf of bread? Take the established tables on nutrition and figure up the cost per person; then cut the pound loaf in two, or to one-third, and tabulate the cost and see to what substantial extent the cutting increases the cost of living. Leaders in the baking industry have seen this big food fact, and they are entitled to your cooperation in demonstration. If food costs can be reduced from 25 to 50 percent through a knowledge of the proper amount and proper food and proper food combinations with bread, making with the bread a correct and adequate balance of protein, fat, mineral salts, and vitamins, is this not a matter for a large part of your interest and effort?

The proper feeding of people logically follows the proper feeding of soils and the important results from long feeding experiments with animals. Proper and economic human food can cure and prevent more disease, produce more efficiency, add more years to the span of vigorous life, than any other single material factor within the present range of educational effort.

Study meats, the amounts, with other foods, best suited to and needed in the daily diets. Study cold storage. The benefits of cold storage can be brought closer to the consumer. The refrigeration employed in storage and wholesale distribution must be extended on throughout the retail markets, on into the home. The consumer needs that intelligence about cold storage that will make an intelligent demand on the retail market; that will introduce proper treatment of cold stored foods when brought into the kitchen. The efficiency and expert knowledge in the middle part of the perishable food industry needs to be extended towards the producer, at the one end,

and towards the consumer, at the other end—efficiency, accurate knowledge, at both ends—as well as in the packing and wholesale middle. Milk and milk products, poultry and eggs, vegetables and fruits, canned and bottled foods, foods preserved by salt and smoke and drying, can, each, be taken up with the several departments of the trade, with the results of vast good, both to the consumer and the firms who perform the service.

(b) *Washing machines, electrical appliances, vacuum cleaners, kitchen planning, cooking facilities* of all kinds, can be taken up in your work, as they are being taken up in the institutes maintained, for example, by certain magazines and the daily papers. In the study of foods you will need the assistance of the departments of chemistry and biology, and in the study of mechanical appliances you can be helped by the engineering departments in studying efficiency of construction and economy in operation. Lighting systems for the farm home, heating systems for both the farm and city home, water supplies for the farm home are matters for your interest and study, along with the other departments of the college and station.

To the inquiry, what project does the home economics teacher need to give special attention to, today, a thoughtful and successful housekeeper replied: "We would like to know about paints and varnishes, the doing over of furniture, the best treatment of our floors, soaps, powders, and cleansing solutions. We need to know more about the wearing qualities of cloths, particularly woollens; about the wearing quality of every material which we purchase ready-made or purchase to make up or to have made up. We would like to know about leathers, shoes, and efficient household disinfectants. We would like to know what vitamins are and just what foods will add them in healthful quantity to our daily needs."

Another woman replied: "I would like to have the services of an expert in home economics, just as we have the interior decorator, to advise on every matter connected with the kitchen, the selection and preparation of the food, proper combination of food, economy in purchasing food, the arrangement of the kitchen and laundry, the making up of a reasonably flexible family budget. I am willing to pay, and to pay well, for such service." This answer suggests a good field for the home economics expert to do professional practice directly and strictly in the interest of the client.

How much do we know about our great woolen and textile industries? We hear them discussed in connection with the political campaigns, but we do not realize how much the prosperity and independence of the Nation are bound up in their profitable success. Take them as projects for study. To enumerate the important industrial project for your study is to make a list of every product and process used in the home and the industries performing the service in the preparation and distribution.

A program for cooperation between the official home economics expert and the industries should include:

(a) Text-books on important foods, household supplies, and on home making and home management. Let us propose a series of text-books suitable for both the classroom and the housekeeper, written by acknowledged experts, under a board of editors to be selected from both the educational institutions and the industries. Such a plan would insure more of adequate and accurate facts.

(b) Scholarships to be maintained by the industries at the agricultural colleges and home economics departments, with the understanding that the

results of investigations be made public, since these institutions are supported from public funds.

(c) Arrangement for teaching staffs to do consulting and investigational work for those industries which will not abuse the cooperation, with full knowledge of the boards of control and faculties.

(d) Vacations spent in the industries and in the actual work. This could be done through the working out of some plan of useful application to an industry, and offering this plan and its execution in return for reasonable compensation. The work of the home economics expert will more and more fit into the advertising and sales as well as into the preparation of many products.

Dr. Helen B. Thompson, Kansas State Agricultural College, presented the following paper:

#### THE RESEARCH WORKER IN HOME ECONOMICS; COURSES PREREQUISITE

BY HELEN B. THOMPSON

To speak of the research worker in home economics implies the existence of a field for investigation, and of that we shall hear in detail later. It is not possible, however, to present any suggestions as to training of such workers without speaking briefly of the history of some early scientific efforts and of the present status of our own professional reservation, known as home economics.

It was difficult, at first, to find a name for the courses in cooking, sewing, and household management. It has taken time to standardize these courses, and it will take some time yet to sort them out into the best arrangement in groups. No single term can describe subject matter as diverse in character as we now include under home economics. It would seem the wise thing to follow the example of agriculture and regard our professional name as the name of a group of well-defined courses all directed toward the same purpose, but having sufficient individuality to need more specific names to indicate the subject matter contained. In my early student days, agriculture was agriculture, and taught the student to handle crops, to care for animals, to market his produce, and to calculate his profits. By way of practical experience it included afternoon laboratory known familiarly as "p. m. work." This the jocular "Aggie" man explained meant a number of things from "planting maples to pitching manure." As present the school or division of agriculture includes departments of agronomy, horticulture, animal husbandry, dairy husbandry, milling industry, agricultural economics—often grouping the requirements for a degree from such a school into two or more curricula.

Should we follow this plan, it will mean that any department of home economics must be subdivided into groups, as is already indicated in many curricula, by "food major," "clothing major," and like terms. It will mean, also, that a college division, or school of home economics, must be organized into departments with as sharp a distinction as it is possible to make between their respective courses.

In the confusion of subject matter, and in the association of courses diverse in nature—alike, in this instance, only in the common purpose of rendering service to humanity through improvement of the home—we are

following the historical development of many other fields of knowledge. Take, for example, biology. The biological sciences are those which deal with the phenomena manifested by living matter. While it may be allowed that no natural boundary separates the subject matter of psychology and sociology from that of biology, since psychology is inseparably linked with physiology, and the phases of social life exhibited by animals, other than man, which sometimes curiously foreshadow human policy, fall strictly within the province of the biologist, it is, nevertheless, convenient to group apart such of these phenomena as are termed mental, and such as are exhibited by men in society, under the heads of psychology and sociology.

In the history of medicine, Hippocrates used his best efforts, with small avail, to separate superstition, religion, and medicine. He expressed a conviction, which met with little favor, when he wrote, "However diseases may be regarded from the religious point of view, they must all be scientifically treated as subject to natural laws." Nor was this leader in medicine and philosophy anxious to maintain the connection between these two subjects which had long existed in a confused and confusing fashion. And yet, with the conscious and consistent effort to be scientific, Hippocrates did not know the difference between a vein and an artery. He had definite notions of osteology, but was unaware of the existence of the nervous cords, and he represented the brain as a gland. Mistakes and childish blunders punctuate even his profoundest writings, but he had, says his biographer, "the merit of early recognizing the value of facts apart from opinions and of those facts especially which lead to general results." Progress in medicine seemed fair in Galen's time, when we find him so sure in anatomy as to be able to distinguish the bones and sutures of the cranium nearly in the same manner as at present. But, alas, we also find him "author of the dogma that the brain is the origin of the nerves of sensation, and the spinal cord of those of motion." It was not until Harvey's day that an important fact in physiology, without knowledge of which medicine could never develop, was demonstrated by a "series of well-executed experiments." The experimental method was regarded as of so little importance that his remarkable discovery was not announced for 20 years. Even then it became the subject of extreme controversy.

When we seem to be making small progress in our work, we may find courage by considering the time and effort it has taken to establish exact methods in other fields of learning and by thinking of how rarely the individual worker grasps truth that will advance knowledge.

While it is true, as Lusk has said, that, "the progress of science is a history of great discoveries of fact which become established, and of destruction of theories which are temporary mental conclusions shown later to be untenable," it is also true that the history of any science will disclose a great deal of confused thought and scattering of efforts among the early workers. Take, for example, Lavoisier, of whose great discovery it is said that there is no other instance of a change so fundamental in scientific thought and method as the one resulting from the overthrow of the phlogiston theory. It is also reported that Lavoisier, as adjoint chemist to the academy, reported on diverse subjects, "from the theory of colours to water supply, and from invalid chairs to mesmerism and the divining rod."

The outstanding characteristic of the men who have developed the



great fields of knowledge has been their ability to hold on to fact in spite of prevailing fancies. In the case of Lavosier, as with many others, there was also the willingness to teach others. As secretary of the State Committee on Agriculture, he drew up reports and instructions on the cultivation of various crops, and promulgated schemes for the establishment of agricultural experiment stations. He started a model farm, where he demonstrated the advantages of the scientific methods of cultivation and of the introduction of good breeds of cattle and sheep. As a member of the provincial assembly of Orleans, he busied himself with plans for the improvement of the social and economic conditions of the community, by means of savings banks, insurance societies, canals, and workhouses. With such a life, it would seem that he kept up his interest in oxygen on the side, devoting to it what most men would put into recreation.

To return from this ramble into the beginnings of some other sciences, I would suggest the thought that we will not need to be rated as unique if generations pass before we can all classify as scientific people. It will not be surprising if we have few with real ability to lead. Some of us may spend our time mapping out problems for investigation, but more of us can help at present by developing our college courses to the point that they become the means of stimulating the desire for study, of directing the inquiring mind in a continued intellectual effort. One home economics research worker in each college will never do this. Be she ever so versatile, she cannot have sufficient training to conduct investigations equally well in the several fields. Foods and nutrition, clothing and textiles, sanitation, household economics, child welfare, social problems of the home, institutional work all require a special kind of work, with preparation to some degree specific. No one can be expected to do them all and certainly one person carrying on research in nutrition cannot be thought to be advancing the other lines. Just why we have not thought research worth while, except in nutrition, is difficult to see. Is it not, perhaps, due to a refusal to analyze the job, with the resulting failure to see the division of labor indicated? What we need is to have the spirit of investigation awakened, and the way to do that most effectively has yet to be found. Why should we not put into positions of leadership, in our different lines of work, women who have the best knowledge of that particular line and who are not only able and willing to keep a problem going with other work in hand, but who can through their own love of their work lead students to seek the reward of work for its own sake? In other words, why not pick the heads of our departments, or the leaders in our different majors, for their research ability as well as for teaching and then let them lead in both? I do not question the value to the world of a life devoted to research alone. It is by this means that certain great benefits have been gained but the time has not yet come for that in our schools of home economics. In this case, as in other sciences, the spirit of research can be fostered most effectively and the "mental urge" toward original work can be best handed on generation by generation by great teachers. The students must come in direct contact with what is being done in the laboratory if they are ever to learn that all truth is not contained in the printed book.

In the matter of courses leading to research, a review of our catalog statements will help us to criticize ourselves intelligently. We note a senior course in millinery described as "designing and making a winter

hat—study of fabrics and trimmings,” this to give 1.5 semester credits; drafting for two semester credits for seniors; advanced weaving, without description—doubtless a continuation of a preceding course, which includes basketry, designing, dyeing, and handloom weaving. One college curriculum provides, as required subjects, four courses in sewing, two in dressmaking, advanced millinery, and advanced basketry; another gives history of costume and cost design in the senior year. One gives sanitation with no bacteriology; another prescribes sanitation in the freshman year, with bacteriology two years later; dietetics in the junior year, followed by food and nutrition in the senior year. Finally, there is a requirement of bacteriology, millinery, and costume design, with all other hours elective in the second half of the junior year, leading (shall we say?) to economics, sociology, and textiles in the first half of the senior year, and graduating the victim with honors on genetics, problems in clothing, and home decoration, for her last semester in college. Research material on graduation? No, a senior who can submit to these indignities will never ask a question pertaining to life or work. If she should it will be purely a rhetorical one, and she will not expect an answer. If we really want to treat our students to these courses, why should we care to have a research person cumbering the premises?

Can any one discover what impulse toward food investigation is gained by the student who follows the course prescribed as “food major” but finds herself studying household management, organization of courses, practice teaching, and the family? Can we expect to develop anything but skill in handwork by a requirement of six hours in our home economics subjects through freshman and sophomore years and three hours only through junior and senior years?

To develop the spirit of inquiry, should not the curriculum be so arranged as to show a sequence of importance in every line of work, each terminating in the senior year with investigation courses which are elective, open to seniors and graduate students, and elastic in the matter of the problem to be assigned and the credits to be earned? For example, an investigation course in food economics will permit of food analysis, which presupposes general and organic chemistry with qualitative and quantitative analysis. Some knowledge of nutrition and dietetics might be useful, but is not an absolute requirement. The same course might include, for other students, experimental cookery, which will be satisfactory in results only if bacteriology and physics, in addition to chemistry, have been included in the prerequisites. In this particular case, chemistry of foods would replace nutrition and dietetics. A course in nutrition investigation may consist of a metabolism experiment for students who have had physiological chemistry and quantitative methods, or it may be a feeding experiment that is dependent upon a knowledge of physiology, or a breeding experiment with animals on different diets, in which a student can use a knowledge of genetics as well as physiology and chemistry.

Clothing economics and household economics demand general economics, statistical methods, sociology and current or modern economic problems. Hygiene of clothing and sanitary problems of the household will gather value from microbiology, both general and pathological, physiology, physics, and organic and quantitative chemistry. Textile research must be based upon organic chemistry, physics and quantitative methods.

It seems unnecessary to add that the value of these courses will be enhanced by the reading which may be assigned separately and individually discussed with the instructor or taken in a seminar course running parallel. The student, by reading from a well formulated scheme, gets the setting of the problem, learns to interpret results intelligently, and to see what still remains to be done. When the instructor can lead the student to see the one point that is doubtful in a proof, or one point that admits of two interpretations, she has paved the way for the naturally inquiring mind to set out on a quest of its own. A student who does not respond with enthusiasm and with willingness to work had better be directed into some other field than research.

To illustrate another point by concrete example: A student who had been graduated in liberal arts entered Kansas State Agricultural College in home economics, and after completing all the prerequisites, asked to be admitted to the investigation course in nutrition. Preparatory to a feeding experiment designed to fit in as one link in a general scheme for the year, reading was assigned. Several papers reporting the evidences and results of general malnutrition were read and discussed with a fair degree of intelligence. The student was then asked to read a paper by Waters and report the one new fact contributed to the knowledge of nutrition. In view of the outstanding nature of the fact—"the increase in height but not in width of malnourished growing animals"—a student of any scientific ability would not fail to get the point. Failure was caused by the undue attention given to the historical discussion of the paper, and after a second attempt with a second failure, the student was urged to drop the course.

This case has been recited to point the moral that prescribed prerequisites and superficial interest will not make a research worker. There are minds of considerable ability which can see things in the past tense only, and for them the effort of seizing facts that will project knowledge into the future is wasted. No group of prescribed courses will train such a mind to work toward a proof of imaginary hypotheses. Nor will any set of prerequisites prepare for all lines of home economics research. One has only to read the report by Langworthy of the results of work carried on in the Office of Home Economics during the fiscal year 1918-19 to see how varied are the problems. Or read the farm home survey made by the Office of Extension Work in the North and West to see how varied are the needs of the home and the family. Indeed, when one thinks of the needs that continue unsatisfied, unrecognized—by many persons unnoticed—one is tempted to let nutrition rest a while, to let humanity go unfed, unclothed, and content to wallow in its own mire, while she devotes her time to helping set aside some of the imbecilic laws of human relations for which no one can give an account, but which perpetuate the conditions we so vainly try to improve. Our only chance of doing research worth while is by setting our problems in accordance with the needs of the family. We can seek truth for its own sake all the more readily, if it applies to the advantage of human life.

The small volume of our present publications and the fact that much of our work needs to be the application of old truths to modify present conditions should not discourage us. Our unkindest critics admit it when we improve our cooking. The kindest ones see the objective, perhaps, better than we do ourselves. It is more important to be training research workers

now, than to turn out any set number of publications. It is important to train our girls in such a manner as to make it possible for them to change environment rather than to leave its indecencies to the less fortunate, while they move on to something already improved.

To do this will require good teaching in all our classes, but it will necessitate putting our abler teachers in charge of our future research workers. The impetus to do graduate work usually comes from the personal influence of an instructor of superior ability. If that ability is being used in research, the student will be inclined to do likewise.

The prerequisites must include, in any case, the related sciences or arts, which will lay the foundation of necessary knowledge, and provide for the required technic. The subjects will differ as the objects differ, the group for the economic and sociological aspects being quite separate from those for textile, food, or nutrition research. Intelligent use of household, mechanical, and physical apparatus, with the purpose of producing efficiency in work and conservation of time for other duties, must depend upon physics and mathematics but overlaps the economic and administrative phases of our work. Sanitary science must include the courses already mentioned and preserve due respect for engineering methods if it does not, indeed, have some knowledge of them. In certain courses, such as nutrition clinic, there must be a collaboration between our social group of subjects, including home problems and child welfare, and the nutrition or dietetics students work in a practicum or as field practitioners.

But all these efforts must be accompanied by a still greater effort to imbue our work with the scientific spirit. If we could have ten colleges each turn out one good investigator this year, and in the next four years five equally good, how long would it be before progress would be noticeable? If succeeding ages could say of any of us as Liebig wrote of Lavoisier, "His merit, his immortal glory consists in this, that he infused into the body of science a new spirit; but all the members of that body were already in existence and rightly joined together," it would be as worth while as if they read our researches.

How we are going to persuade our students to inhibit that domestic inclination to get all their own meals, "because they like their own cooking," I confess I do not know, unless we convince them that the "only one hour a day" devoted to this harmless pursuit would keep a research problem going at a slow but even pace. So long as we continue to turn out students who elect fine needle work and millinery as seniors, or who look upon marriage as an escape from intellectual life, there seems little hope for us. When women holding a college degree justify the job of housekeeping for two as a sufficient one for all their energies, and our advisors on curriculum-making hand back to us in the name of education, courses long since discarded or relegated to the high school, it is time we took account of our methods, for the correction of which Bernard Shaw may as well have said of education, as he did of the church, that "our need will be truly met \* \* \* when we leave outside the door the materializations that help us to believe the incredible and the intellectualizations that help us to think the unthinkable."

When we have reached that stage the truth to be gained by research will seem important enough to demand work from us and from our students.

THURSDAY MORNING, OCTOBER 21, 1920

Two papers on the subject of home making, one presented by Miss Anna E. Richardson, Federal Board for Vocational Education, the other by Miss Octavia Hall, Peter Bent Brigham Hospital, Boston, Mass., were as follows:

HOME MAKING TEACHERS, SCOPE OF SUBJECTS IN TRAINING COURSES

BY ANNA E. RICHARDSON

The passage of the Vocational Education Act imposed upon the State boards for vocational education the responsibility for training teachers for vocational schools and classes. This responsibility in large measure has been delegated to you, for the State boards for vocational education have very generally designated the land-grant colleges to train vocational teachers of home economics, as these institutions were already well qualified with strong home economics departments and in many cases admirable teacher-training courses.

The importance of the preparation of teachers as a part of the program for the promotion of vocational education can be measured in terms of the fundamental importance of trained teachers in establishing, maintaining, and expanding any form of education. The importance of this problem makes it imperative that the States set up plans for teacher training which will develop women of broad sympathy, with sound training, and an understanding of the needs of the home maker and the scope of the vocation. What are the essentials of such a teacher-training course?

This discussion will consider teacher training as a form of vocational education, in the largest acceptance of the term, to be based upon and guided by the accepted principles of vocational education. Preparation for teaching in a vocational field must of necessity be a composite of technical training for employment in the occupation and professional training for teaching that vocation. The scope of the subjects in such a training course must, therefore, be determined by the application of a few of the fundamental principles of vocational education.

(1) The primary guiding principle in planning training for a vocation must be the needs of persons who are to follow the occupation, as determined by a careful analysis of the vocation.

(2) Participation in the occupation is a fundamental part of vocational preparation.

(3) A wide background of related knowledge is essential to superior quality of practical work and to an understanding of its significance.

(4) Sound vocational preparation will include instruction designed to develop insight on the part of the worker into the social and economic importance of the occupation and the social and economic responsibilities of the worker.

The acceptance of these principles makes it clear that the technical training which the teacher of home making must have is that which will fit her for the vocation of home making, that the professional training must develop the ability which will enable her to teach this vocation to others.

To a certain extent the work as offered for the training of home economics teachers has always been planned on this basis—only to some

extent, for we are all not yet awake to the full significance of what is necessary in the training of teachers of home making nor have we very consciously analyzed the curriculum, weighing each course from the point of view of its function as training for a vocational teacher.

As I have studied the problems of teacher training in the land-grant colleges, and the returns from the questionnaires sent out by the Committee on Improvement of College Teaching substantiate my observations, we have been primarily concerned with the development of good college courses in home economics. Incidentally provision has been made to give to our students sufficient professional work to insure them a teacher's certificate. Frankly, some of our land-grant colleges are still a bit skeptical of the value of professional training. We have looked with some contempt upon the requirements imposed by the State boards for certification and have encouraged our students to take advanced work in some phase of home economics rather than in professional subjects.

With the passage of the Vocational Education Act and the delegation to you of the responsibility for training vocational teachers, the land-grant colleges have assumed a solemn obligation. If you are willing to accept this challenge, it is for the college to state its purpose and measure results in these terms, for your purpose inevitably becomes the selective or organizing principle in determining the instruction offered.

Teachers of vocational subjects should be required to possess definite and clearly defined qualifications. That the teacher should possess vocational experience adequate to her particular task is fundamental, but the vocational school is not simply a device for teaching a trade. To quote from one of the bulletins of the National Society for Vocational Education,<sup>1</sup> "It is a school dealing with the education of adolescent children. As such, it has responsibilities similar to those of any secondary school. Like other public schools, it must require of its teachers certain qualifications as to personality, education, and teaching ability."

The qualifications necessary for successful home economics teaching service in the vocational school, are of four kinds:

- (1) Technical qualifications.
- (2) Teaching qualifications.
- (3) General educational qualifications.
- (4) Personal qualifications.

Technical training should include specific training in the vocational subjects to be taught, as well as personal experience of a satisfactory kind in the pursuance of the vocation. Professional training should include fundamental education courses, some knowledge of the principles of vocational education, special methods, and practice teaching in home making subjects. The general educational qualifications should include training in general subjects, as ordinarily given in our colleges, as well as a specially designed course in sociology, economics, and in related subjects. The personal qualifications have to do with questions of character, personality, health, and appearance, and the development of these should be one of the fundamental aims of all of our education.

I shall limit this discussion to the scope of subjects under the first two points—technical training and professional training.

<sup>1</sup> Bulletin 19—Preparation of Trade Teachers.

The technical training offered as a part of the preparation of home-making teachers must be determined, as suggested above, by the needs of the vocation. This can only be successfully determined by an analysis of the duties and responsibilities of the home maker. Such an analysis shows that for a great majority of home makers, her function in the home is twofold; that she is both a worker and a manager, and that her duties can be grouped on this basis.

- (a) As a worker, the occupations of the housewife are:
  - (1) General housekeeping, including the care of the house and its equipment.
  - (2) Cooking and serving of meals.
  - (3) Buying of food, clothing, and shelter.
  - (4) Care of children.
  - (5) Garment making and dressmaking, including care and repair of clothing.
  - (6) Care of the sick.
- (b) As general manager and joint owner of her own enterprise, the responsibilities and duties of the home maker are:
  - (1) As owner, determining the product to be turned out in terms of the standard of living and the efficiency of the home.
  - (2) As superintendent of the plant, planning her own work and and the work of members of her family and employees.
  - (3) As joint business manager, budgeting expenditures, keeping household accounts, and determining when the finished product is to be bought and when produced at home.
  - (4) As joint educational and social manager, planning the activities of the family as they concern the relationship of its individuals and of the family to society.

The above analysis may seem to be extensive, but only serves to emphasize the varied duties of the home maker and the importance of a clear understanding of what her work is, so that we may be able to give her the sound training needed to develop the American home to the fullness of its possibilities.

The purpose of home making training, is to give the young woman an appreciation of the home as a social institution and an understanding of the economic and social relationship of the modern home and society, for the home maker is responsible, not only for the management of the home as it affects the physical welfare of the family, but also for the less tangible but even more important social and spiritual aspects of the family life. In addition, she must be skilled in the work of the home and proficient in its management. Can we gain this ideal for our vocational teachers by a major in foods and nutrition, or a major in institutional management or clothing and textiles? No—we will all agree to this, but we have not yet all reorganized our courses so that we do at least provide for certain minimums of instruction in the many-sided, composite occupations which the analysis of home making reveals it to be.

At a conference of State supervisors and representatives of the teacher-training departments held last spring in Denver, a committee approached the subject of the scope of the teacher-training curriculum from the angle of vocational analysis and made a good beginning in setting up the mini-

mums of the various phases of home making which should be required of every student who expects to be a teacher of home making. Time did not permit of a full discussion of content or of standards of proficiency which should be the aim of the course, rather than a requirement of so many hours of work in foods, clothing, child care, etc.

It is still difficult for us to think of a college course in terms of accomplishment rather than time. The college grants a degree for 120 or 140 hours, which usually means four years of college work, practically regardless of capacity on the part of the student as measured by her ability to handle new problems. The pendulum is now swinging in the other direction, and the new note has been struck; we are beginning to think of a course for the training of teachers in other terms than those of time only, for too long the constant has been *time* rather than efficiency, with a realization of the aim of vocational training; we are beginning to demand *efficiency* as the constant, with time as the variable.

Are we demanding too much when we ask that no teacher be allowed to take charge of a vocational class who cannot show evidence that she not only understands home making from the theoretical side but that she actually can manage a home?

I am sure that the majority will agree that the great outstanding weakness in the young teacher is that the instruction is too theoretical. Although the technical work is, in many cases, of a high order, it fails in the classroom, because the young teacher attempts to give to her group of prospective home makers, technical home economics, in terms of technical information rather than as a solution of their daily problems.

We agree that our teachers should have practical experience in home making and technical training which will make them intelligent and independent workers. Are we demanding too much when we ask the teacher-training departments of the land-grant colleges to provide both? Most of the States have barely made the requirements of two years of practical experience either as a prerequisite to or a part of the training for teachers, yet in the three years in which we have been training vocational teachers, practically nothing has been done either to provide vocational experience or to determine standards of measure for effective vocational experiences. Can the colleges offer sufficient time to develop experience and skill in the management of a home and yet maintain their standards for college work? The nearest approach to vocational experience which the colleges have offered has been gained in the home management courses in which the students have had an opportunity to live from one to 12 weeks in a house in which a group project in housekeeping has been undertaken. This work has been maintained on a fairly high scholarship basis and has for the most part won recognition from college authorities as meriting credit.

Various good suggestions for providing vocational experience have been made, such as summer practicums, home projects involving a large amount of managerial experience, the acceptance for registration in teacher-training courses of only such women as have had adequate contact with the vocation of home making. Massachusetts and California stand out as the leaders in this latter experiment and we are waiting with much interest to see the results.

The land-grant colleges have not been conscious of the very great need



of actual contact with the vocation of home making on the part of their student teachers, because, in the main, the teacher-training departments have considered only the problem of training teachers for the day schools. The students in these classes have had limited home making responsibility. The problem of the training of the teachers for the day schools is a small part of the State program for teacher training and if the land-grant colleges are to take any part, either through resident or through teacher-training centers, in the preparation of vocational teachers for part-time and evening classes, it will become increasingly important to recruit mature women with practical experience in the phase of home making which they are to teach.

As was stated above, preparation for teaching in a vocational field must of necessity be a composite of technical training for employment in the occupation and professional training for teaching. We have, thus far, dealt with the *technical* preparation for the teacher of home making. We must now consider the *professional* side of the training of the vocational teacher.

Before considering the scope of professional courses, it is well to discuss briefly the general question of the organization and administration of the teacher-training department. This is one of great importance in the future development of effective teacher-training work.

From a study made last year of the organization and administration of teacher training in the land-grant colleges, it was found that this differed in the various institutions. In some colleges the home economics departments were entirely responsible for the training of teachers, in others the education departments were entirely responsible, having as members of their staffs women trained in home economics and in education giving the special work in methods and supervising the student teaching—while in still others there was joint relationship between the home economics and the education departments. In the latter case, usually the home economics department was responsible for technical subject-matter courses and the education department for professional work, while the instructors responsible for methods in home economics or for supervised teaching were joint members of both faculties, sometimes employed upon joint recommendation, sometimes upon the recommendation of one only, while nominally holding membership in both groups.

A study of the situation has shown in most institutions strong departments of technical work, but rather weak departments of teacher training. Too frequently the responsibility for the home economics education has been left to junior members of the home economics faculty, some of whom have had thorough work in education and many of whom have had the minimum amount. The results of the recent questionnaire sent out to the colleges by the Committee on the Improvement of College Teaching seem to indicate that the college faculties responsible for home economics education have not specialized in education, but for the most part are well trained technical people with varying amounts of educational courses. This situation seems to me to warrant a very frank facing of the question by all of us, so that we may see where we stand in this matter of teacher training. I do not believe that an organization which results in the separation of subject matter from methods will give the best results, for as I earlier stated in this paper, the dominating purpose of this composite of

technical and professional training should be throughout *preparation for teaching*. I am not advocating that every girl who is preparing to teach should major in the education department, and I am equally unwilling to urge that the home economics department of the college be given the responsibility, for I do not believe that this will offer the greatest future to the training of teachers of home economics.

I am urging that whatever the plan of organization may be, let it be clear that the aim is teacher training, and that there must be a staff qualified to handle the problem of the professional training of home economics teachers. Do not let us continue to train vocational teachers by giving to our students the best home economics instruction of which we are capable and then, as an insurance against the need of a job, enough professional work in education to get by with the State board.

The professional courses necessary for training vocational teachers group themselves into

- (a) General education courses as a background and basis for special courses in home economics education.
- (b) Vocational education problems in the general field.
- (c) Home economics education.
- (d) Supervised student teaching.

It is not necessary to discuss in detail these courses, for although there is still difference of opinion as to the amount of time to be given to the various subjects and their order of importance, we find a practical agreement on the part of the majority of institutions as to the general scope of the work.

There are two aspects of the professional training which at this time need some further emphasis, namely, the question of teaching methods and the organization of facilities for adequate supervised teaching. What is the best way to present the technical work in home economics so that it may serve as a basis for teacher training? There is difference of opinion on this point, for some educators feel that in a course designed to train teachers, the best results are gained from an organization of the technical courses from the viewpoint of the teacher; in other words, elementary technical courses should be professionalized. My position on this question is that the best professionalized course in home economics is that which is presented from the standpoint of the needs of the groups following the vocation of home making. Do I make this perfectly clear? The best qualified teacher of home making is a woman versed in home making and trained to present her material to home makers. Studies on this point show that our students are close imitators and that our young teachers go out from college poorly equipped in methods of teaching because they have themselves been subject to poor teaching for four years and this bad effect cannot be overcome in the few short hours devoted to training in good methods of presentation. I am, therefore, urging that all of the home economics offered in elementary courses, as a part of the technical training, be offered to the group as preparation for home making. After the students are equipped with the fundamental instruction which they should have as home makers, they are then ready for professional work which will give an educational basis for their teaching and help in the organization of the technical home making material, for classroom instruction.

Supervised teaching, as a part of the preparation of a vocational

teacher of home economics, needs earnest consideration by administrators responsible for teacher training. The problem presents the same questions which are involved in the preparation of teachers of any subject, for all supervised teaching is designed to give the student teacher vocational experience in teaching. The time which must be spent in teaching, the amount of supervision necessary, and the type of class which will best furnish experience in teaching, must be determined by the type school into which the young teacher expects to go, and by the individual capacity of the student teacher. Other factors considered, the class which will give to the vocational teacher of home economics the greatest opportunity to develop power in teaching is a class in home economics for home makers. I do not mean a class of adults, for I am discussing the preparation of teachers for all-day schools, but I do mean a class whose purpose is home making, and the instruction offered is organized on this basis. The supervised teaching should give the student teacher an opportunity to teach various phases of home making from the standpoint of the girl in relation to her family needs now, and her future home making responsibilities. Time does not permit of a discussion of the various plans, for providing satisfactory student teaching, which are being tried out by the teacher-training institutions. It is sufficient for us here to emphasize the purpose of supervised teaching as a part of the training of a vocational teacher. The opportunity is with each of you to provide this in the way in which it seems best to meet the needs of the teachers of your States.

My whole discussion has to do with the four-year training course within the institution, as at this time it is one form of teacher training in which all of the land-grant colleges are concerned. This paper does not permit of a discussion of the plans for itinerant teacher training nor of the service which the colleges might render the State boards in the improvement of the teachers already employed in the field. Neither have I been able to discuss the preparation of teachers for part-time and evening schools. The average graduate of the teacher-training departments of our colleges is not prepared to handle this type of work and if the colleges are interested in rendering a service in this field, they should study the opportunities for training which the evening and part-time schools offer.

In conclusion, I should like briefly to summarize the points made in this discussion:

- (1) An analysis of the vocation of home making should determine the scope and content of the technical work in home economics.
- (2) Experience in the vocation of home making is essential for a teacher of home making.
- (3) The professional work offered must equip the technically proficient student to teach in the vocational field of home making.
- (4) The purpose of the course, which is to train vocational teachers of home economics, must be the organizing principle which governs the scope of subjects.

## SUPERVISED POST-GRADUATE EXPERIENCE IN HOSPITALS AS STUDENT DIETITIANS

BY OCTAVIA HALL

It is from land-grant colleges that many of our student dietitians come. It will, perhaps, be interesting then to discuss the experience these young women have in the Peter Bent Brigham Hospital as student dietitians. Most of the young women come very well prepared in theoretical knowledge as we have insisted upon certain entrance standards. A B. S. degree, with a home economics major, is required. A letter of recommendation from the head of the home economics department is asked for, requiring a statement as to the young woman's personality for such work, and as to her scholastic standing and executive ability. She must be 23 years old, or recommended especially as having the poise and mature judgment of an older person.

It is necessary to impress upon the young college women that the work in the hospital is serious and not experimental, that they are dealing with real cases, and that they are responsible for this one thing to be done accurately and sensibly. So many girls come with the care-free attitude that one finds in college students.

Each girl is interviewed soon after commencing the work, and is asked to state what sort of a position she wishes to fit herself for—administrative or more technical work, such as dietotherapy or metabolic work. At this interview she is told of hospital etiquette and of the importance of carrying out directions exactly and the necessity of always being punctual.

The course given is of four months' duration. It is first necessary to establish a balance between the theoretical and practical, and with this in view, the very practical work has been placed first in the course. The first two months are spent in actual work and supervision in the main kitchen and central serving room. Here the student learns to handle the employee, learns ordering and cooking in large quantities, learns the correct service of foods in the most economical manner. The last two months are spent in more theoretical work—the calculation and preparation of special diets for metabolic diseases and infant formula. Clinical work in the out-patient department is given if the student so desires, and clinics outside of the hospital, such as nutritional and diabetic clinics, are attended regularly. It will be well to add here that arrangements may be made for a month's extra time doing metabolism and calorimetry work under the supervision of a trained technician. This, however, is not included in the regular four months' course. Marketing with the dietitian once a week and checking of the incoming supplies in the hospital store are given to the student who intends to go into a general administrative dietetic position. A week is spent in the dietitian's office learning menu writing, requisitioning of supplies, and office routine. An important feature in the course is a weekly conference of the students with the dietitians and the assistants. At this meeting, problems that arise daily with the students and also with the dietitians are discussed. Reports are made of interesting cases that are being treated with special diets from the diet laboratory. Reviews of current articles are given, and bits of information, interesting as they pertain to the hospital or dietetics, are added to the conference.

These meetings have not only proven interesting and beneficial, but help to bring out individual personality, which is necessary knowledge to the

dietitian, in order that she may be better able to judge and help the student. Many of the girls come from college with enthusiasm and inspiring ideas and methods which help to revive the conservative dietitian. At the end of this four months' course we consider that our student dietitian has become a trained dietitian—but how often we are disillusioned!

Miss Katherine Fisher has said in an article on the training of student dietitians, "A girl who has had home experience, who has taught a year or two, and who has had some social experience, is going to make a background for a successful dietitian." Such a young woman as Miss Fisher describes, and who has had the experience as student in a hospital, ought to make a splendid *trained* dietitian (the rare person that so many hospitals are asking for nowadays).

Constructive criticism is always good, and critical criticism offered in view of broader experience is even more helpful. With this thought in view, a number of the more successful dietitians who had taken the course at the Peter Bent Brigham Hospital were written to, and were asked to answer two questions. In answer to the first question—"What do you consider the strong points of the course?"—many interesting answers were received, one being, that actual practical work was done in every department, that the student had experience each day in entire charge of the department she was in when the matron was off duty. In reply to the second question—"Will you offer suggestions to the improvement of the course in view of the experience that you have had in your present position?"—the following suggestions were made: A longer course, with more experience in buying, and a better knowledge of how to teach dietetics to nurses. The need for a six months' course as student dietitian is being felt more and more, and it will be very helpful to know how the universities and colleges are going to feel about this. Many essential and helpful things could be included in the longer course and, as a result, better judgment and the ability to meet calmly the many cases of emergency that arise would come to the student.

#### ELECTION OF OFFICERS

Officers were elected as follows: Chairman, Edna L. Skinner of Massachusetts; secretary, Mildred Weigley of Minnesota.

## MINUTES OF THE EXECUTIVE BODY

The Executive Body was called to order by the president of the association, Chancellor Samuel Avery of the University of Nebraska. The secretary of the association, Dean J. L. Hills of the University of Vermont acted as secretary. The vice-president of the association, Dean Eugene Davenport of the University of Illinois, and Dean R. L. Watts of Pennsylvania State College, were recognized as voting members.

### COMMITTEE ON GRADUATE STUDY

Question as to the continuance of the Standing Committee on Graduate Study was raised, and, following discussion, the matter was referred to the Executive Committee with power. (For action see p. 282.)

### REPORT OF COMMITTEE ON COLLEGE ORGANIZATION AND POLICY

The report of the Committee on College Organization and Policy was read by the chairman, President K. L. Butterfield of Massachusetts Agricultural College as follows:

The agricultural vocations are not, at present, attracting men as are certain other professions such as engineering, business and possibly even law and medicine. It may be argued that there are fewer men capable of success in agriculture than in other occupations, that there is no opportunity for spectacular and fabulous fortunes in agriculture, or that formal academic training for agricultural occupations is not so highly specialized as in other fields. The facts are that the agricultural vocations offer attractive opportunities for leadership of the very best native ability, for fair financial returns, and for a real career. This is true not only in occupations allied to farming, but in farming itself. But the opportunities in business and engineering have been exploited; agricultural opportunities have been neglected. Perhaps this is due in part to the narrow definition of agriculture that the land-grant colleges have allowed to prevail, or to their inability to furnish adequate courses of training for some of the newer vocational opportunities in agriculture, or simply because the appeal to the students comes so much more loudly from the city than from the country.

The question your committee would present is whether the time has not arrived for a definite campaign of education, and of exploitation if you please, with reference to opportunities for men and women in agriculture. We need to gather facts in order that interest may be supported by public intelligence. We should discover the needs for trained leadership in agriculture, ascertain to what extent these needs are being met by existing agencies, remain continually on the lookout for a large field of service for men trained in agriculture. At the present time there are many lines of endeavor intimately connected with agriculture that require an agricultural training but for which men are being utilized who have only an incidental training in agriculture. Such enterprises as country banks, grain com-

panies, farm machine companies, country newspapers, and even professions such as medicine, law, and the ministry, are filled in the countryside with men who have had not the slightest bit of definite training for the rural field. The farm community suffers from this inadequacy of trained specialists in these professions, because these persons are not only ignorant often times of conditions and problems, but are even unsympathetic with fundamental difficulties and needs.

Now, this discovery of facts and their organization and interpretation should not be left to chance nor to private business enterprises, but should be achieved by the colleges themselves. The colleges should, moreover, give thorough publicity to the matter so that the public may understand the problem, particularly so that the essential relation of farmers to the economic and social welfare of the Nation may be appreciated. These facts should also be so advertised that the youth of the country may know the opportunities for a satisfactory career in agriculture.

It is suggested, therefore, that steps be taken to study this problem somewhat as follows:

- (1) Make a list of the vocations for which an agricultural college training is essential, either in whole or in part.
- (2) For each of these vocations give briefly: (a) General facts relative to the demand for men. (b) Localities where opportunities are most attractive. (c) Financial possibilities. (d) Training required. (e) Personal qualifications necessary for success.
- (3) Determine the extent to which existing agencies of preparation meet the demand for trained experts.
- (4) Differentiate, if possible, between the agricultural vocations for which the agricultural college is obliged to train men in order to meet local or State demands, and those vocations which are national or international in scope.
- (5) Organize a registration bureau where may be kept lists and records of men available for various agricultural vocations.
- (6) The lists of agricultural vocations should be distributed to the high schools, libraries, farmers' institutes; magazine and newspaper publicity should also be secured.

There are two methods of administration for this scheme.

First of all, your committee would urge each agricultural college in the country to organize and maintain a service of this sort. This, we believe, is in the interests of the colleges themselves, of the youth of the State, and of the Nation as a whole.

But this problem transcends State lines at several points. Not all vocations are equally distributed throughout the country. Some of them are international in character. Indeed, there has never been any special effort on the part of the agricultural college to keep its graduates within the borders of the State. In other words, this problem affects the whole sisterhood of agricultural colleges and can never be thoroughly worked out except on a national basis. Your committee believes, therefore, that there should be a central clearing house on behalf of the agricultural colleges of the country established either by this association or in the Department of Agriculture at Washington. The service probably calls for a well-paid executive officer and a rather substantial clerical force. There is a vast amount of material to be gathered, sifted and interpreted. The work

should be standardized so that the returns from each State may be made comparable with those from every other State.

The registration bureau should be more than a record of men who are seeking employment, and should be so conducted as to result in frequent promotions and transfers, when such can be made to the mutual benefit of the individual and of the institution. Heads of institutions should be able to consult this bureau for men available for the most responsible positions, such as directors or heads of departments. This central bureau should become an employment clearing house both for institutions and for individuals. The manager of the bureau should seek to discover new fields for lucrative employment for agricultural college men, also to learn of new requirements in the training of agriculturists.

#### **SOME IMPLICATIONS GROWING OUT OF THE RECOMMENDATIONS**

(1) Each agricultural college will state its problem in terms of its national and possibly even of its international obligations, as well as with reference to State needs. Of course, this has special reference to the education of students, although it has some bearing upon both research and extension service.

(2) Each agricultural college will of necessity emphasize that form of training which will best meet the agricultural needs of that State. This is particularly true of the college from which a fair proportion of its graduates actually go back to the farm. When it comes to the training of specialists to meet wider demands of national and international vocations, some plan of cooperation must be developed. This brings us to an extremely difficult and important matter. We will put it in the form of a question.

(3) The question is, should not consideration be given to the possibility of reducing to the minimum the number of colleges attempting to train men for the whole range of highly specialized lines of agricultural endeavor? Is it not possible to get an agreement among the institutions to take up particular fields, especially for advanced work? Could not colleges giving post-graduate work be arranged by groups for different sections of the country, each college within the group to strengthen its accepted line or lines on the basis of interstate, national, and international service? The other colleges within the group would confine their efforts in the remaining lines to the special needs of the State. The committee realizes the difficulties in the way of such a plan and is perfectly willing to concede that it may be a vision for the distant future. It would, nevertheless, like to press the question upon your attention sufficiently to discover whether you are not ready to assent to the idea that if we are to do the very best service for agriculture with the public funds that are likely to be at our disposal, must we not very soon come to a division of labor, particularly in research and in the training of high-grade specialists? Must we not more fully recognize the fact of a national system of agricultural colleges and consequently secure a far larger measure of coordination of effort, and complete efficiency and economy among the different colleges?



## RECOMMENDATIONS

Your committee recommends:

(1) That each agricultural college establish as soon as practicable a system by which precise facts concerning agricultural opportunities may be gathered, interpreted, and distributed among the people of the State, particularly the young people, and that each college not only seek to give adequate training for these various vocations but occupational counsel and advice to all students seeking the training.

(2) That a further study be made, by such committee as the association may designate, of the two-fold question whether this sort of service can be nationalized in order that States may cooperate with one another, and whether it is possible to secure a regional classification of institutions on the basis of particular lines of vocational preparation to be emphasized, in order to gain both effectiveness and economy in the use of public funds for agricultural education.

The committee also appends a tentative classification of agricultural vocations.

## TENTATIVE CLASSIFICATION OF AGRICULTURAL VOCATIONS

1. *Practical Agriculture and Horticulture—*

General farming.

Dairying.

Irrigation farming.

Cattle raising.

Fruit raising.

Citrus fruit raising.

Hog raising.

Sheep raising.

Market gardening.

Other specialized forms of farming, such as corn raising, wheat raising, etc.

Floriculture.

Forestry.

Landscape gardening.

Care of estates.

City forestry.

2. *Agricultural Teaching—*

In colleges.

In high schools, county agricultural schools, etc.

3. *Research Work in Agriculture and Allied Sciences—*

Administrators.

Experts attached to United States Department of Agriculture.

Experts attached to State experiment stations.

4. *Extension Work in Agriculture and Home Economics—*

Administrators.

Experts attached to United States Department of Agriculture.

Experts attached to State extension service organizations.

County agents, advisers, or demonstrators.

5. *Federal and State Departments of Agriculture—*

Administrators.

Specialists.

6. *Scientific Experts in State Employ—*

Entomologists.

Botanists.

Veterinarians.

Bacteriologists.

Directors of markets.

7. *Agricultural Business*—  
Insecticide.  
Fertilizer.  
Grain.  
Farm implements.
8. *Agricultural Journalism.*
9. *Rural Social Service*—  
Rural teachers.  
Country preachers.  
Y. M. C. A. and Y. W. C. A. secretaries.
10. *Commercial Experts*—  
Sugar chemists.  
Insecticide chemists.  
Fertilizer chemists.  
Botanists.  
Bacteriologists.  
Entomologists.
11. *Foreign Service*—  
Agricultural missionaries.  
Agricultural experts for foreign governments.  
Salesmen for farm implements.  
Foreign trade experts.
12. *Miscellaneous*—  
Veterinary surgeons.  
Irrigation engineers.

The report of the committee was received.

Following a full discussion of the report, separate action was taken on the following specific recommendations of the committee:

- (1) Preparation and dissemination by each land-grant college of facts relating to agricultural opportunities, etc.;
- (2) Nationalization of the work under (1); regional classification of the land-grant institutions on the basis of particular lines of vocational facilities.

The first recommendation as to self-examination was adopted; in respect to the second, the committee was asked still further to consider the matter and to report at the next convention.

#### MILITARY AFFAIRS

Following a discussion of institutional responsibility for military supplies furnished by the War Department and an exchange of experiences as to methods of dealing with shortages, fire losses, the carrying of insurance, bond requirements, etc., on motion, the Executive Committee was requested in the near future to discuss with the proper officials in the War Department the whole matter of the furnishing of military supplies, with a view of securing such modification of existing legislation or enactment of remedial legislation as may tend better to protect the land-grant colleges against unavoidable property losses. See also p. 284.

#### STATISTICAL REPORTS OF THE FEDERAL BUREAU OF EDUCATION

The question of the late date of the issuance of the annual reports of the United States Bureau of Education dealing with land-grant college statistics was broached. The statement was made that the bureau was

behind in its publication; that to be of service reasonably up-to-date information was needed. Messrs. C. D. Jarvis and G. F. Zook, sitting with the Executive Body as visitors, stated that they believed this situation remediable.

Considerable discussion was held as to what items in the statistical report were particularly useful, the consensus of opinion being that statements as to staff, student enrollment, property, income, and disbursement of funds, were in this category. The outcome of the discussion was that, on motion, it was voted that the Executive Committee be requested to get in touch with the Bureau of Education officials with a view of issuing on their joint authority a questionnaire asking for information on these points, thus enabling the issuance of a relatively prompt statement as to the more important matters of interest, it being understood that a time limit of relatively short duration—perhaps two months—be placed upon the colleges and that the preliminary publication deal only with the data received within the time limit. It was pointed out that most institutions could give nine-tenths of the information needed with little effort and that the Bureau of Education was in a receptive mood touching this proposition.

#### DUES FOR 1920-21

On motion, the dues for the next year were fixed at \$75 each for institutions dealing with resident teaching, research, and extension; \$55 for institutions dealing with resident teaching and extension only; \$35 for institutions dealing with resident teaching only; and \$20 for institutions dealing with research only.

#### DUES FOR AMERICAN COUNCIL OF EDUCATION

On motion, it was voted that the usual dues of \$100 be paid for the support of the American Council of Education.

#### REPRESENTATION IN AMERICAN COUNCIL OF EDUCATION

On motion, Dean Eugene Davenport of the University of Illinois was chosen representative with the American Council of Education for the term of three years.

#### REPRESENTATION IN THE NATIONAL RESEARCH COUNCIL

On motion, President A. F. Woods of the University of Maryland was chosen representative with the National Research Council for one year.

#### HONORARIUM—DR. ALONZO E. TAYLOR

On motion, an honorarium of fifty dollars (\$50) was voted to Dr. Alonzo E. Taylor of the University of Pennsylvania on account of his address dealing with the world's wheat supply (see p. 39).

#### DISCONTINUANCE OF THE COMMITTEE ON GRADUATE STUDY

On motion, the vote taken at the preceding session (p. 277), referring the matter of the continuation of the Committee on Graduate Study to the

Executive Committee was reconsidered and, on motion, the standing committee was discontinued and discharged with the thanks of the Executive Body for duty well performed.

### THIRTY-FIFTH CONVENTION

Considerable discussion occurred as to the location of the thirty-fifth convention, whether at New Orleans or Washington. A show of hands indicated a 2 to 1 preference for the former city. Stress was laid upon the desirability of getting in touch with the Executive Committee of the National Association of State Universities, with a view of unifying the locations if possible of the two conventions, the one to follow the other in the manner which has long obtained. The suggestion was made that a joint session of that association and of the Executive Body of the Association of Land-Grant Colleges might prove feasible and profitable.

### MATTERS CONCERNING THE UNITED STATES DEPARTMENT OF AGRICULTURE

The chairman of the Executive Committee stated that under date of July 6, acting in accordance with instructions of the Executive Committee, he had made the following suggestions to the Secretary of Agriculture:

That the Executive Committee urges upon the Secretary of Agriculture the early appointment of an under-secretary to guide and correlate the scientific work of the Department.

That the Executive Committee request the Secretary of Agriculture to appoint a representative of the States Relations Service to the Joint Committee on Projects and Correlation of Research.

That the Executive Committee request the Secretary of Agriculture to expedite the publication of the program of work of the experiment stations which the Office of Experiment Stations has in preparation.

That the Executive Committee request the Secretary of Agriculture to have the departmental program of work made more definite as to lines of investigation so that station workers desiring further to cooperate may be informed on the work in progress.

The chairman of the Executive Committee stated that, as had been set forth by the Secretary of Agriculture in his address before the general session (page 39), the creation of the position of under-secretary to deal specifically with the research work of the Department, was to be recommended to Congress; and that he was informed that the other three matters called to the Secretary's attention had already been, or in the near future would be, favorably considered.

### SMITH-HUGHES WORK

The chairman of the Executive Committee stated that the committee had held a satisfactory conference with Messrs. L. S. Hawkins and C. H. Lane, representing the Federal Board for Vocational Education; that a tendency was manifest looking towards a modification of the Federal regulations which now restricted the student membership of Smith-Hughes classes solely to Smith-Hughes students, and as to the use of Smith-Hughes funds in connection with the teaching of fundamental subjects; that a broad view and liberal spirit was manifested; and that, apparently, the board was recognizing the land-grant colleges as the logical institutions to handle the teacher-training work in agriculture and home economics.

President W. E. Stone of Purdue University stated that every land-grant college executive should be in a receptive mood in the matter; that the institutions as a unit should offer themselves for Smith-Hughes work; that lukewarmness on the part of anyone tended injuriously to affect the interests of all; that outside and antagonistic pressure had been brought to bear against land-grant college interests in this matter; and that a united front was vitally necessary.

On motion, it was voted that it was the sense of the Executive Body that teacher-training work under the Smith-Hughes Act was one of the most important duties placed upon the land-grant colleges, one which should be shirked by none but be sought and welcomed by all.

#### FOREIGN AGRICULTURAL RELATIONS

President R. A. Pearson stated for Dean Davenport and himself, members of a special committee appointed to consider our agricultural relations with foreign countries, that in the opinion of the committee this country should be represented in all the principal regions of the world by agricultural ambassadors whose duty should be to enter into such relations with the countries to which they are accredited as would tend to cooperation and to the gathering of information that would be to our advantage agriculturally.

On motion, the report of the committee was received and adopted.

#### MILITARY MATTERS

Following discussion, on motion, it was voted that a Standing Committee on Military Affairs be created; and the president appointed as members of the committee: For three years, Presidents W. H. S. Demarest of New Jersey and W. B. Blizzell of Texas; for two years, Presidents W. E. Johnson of South Dakota and F. L. McVey of Kentucky; for one year, Presidents W. E. Stone of Indiana (acting chairman for purposes of organization) and A. R. Hill of Missouri.

Following discussion, on motion, it was voted that the Executive Committee be asked to endeavor to schedule two sessions of the Executive Body at an early date on the next convention program, one to deal specifically with military affairs, the other with institutional administrative problems.

In the matter of excuses from basic R. O. T. C. work because of prolonged service in the Army or Navy during the World War, it developed that several land-grant colleges are excusing men, on the ground that such service satisfied institutional requirements in military science. It was pointed out that during the summer of 1919, an order was issued to the effect that it was for the institution to determine in individual cases when and how the definite credits for military science had been satisfied; and that at the Chicago convention, Colonel Morrow had stated that the institution's power to make exceptions was undoubted.

Following discussion as to the relatively small numbers of seniors and juniors taking the advanced R. O. T. C. course, on motion, it was voted

that the Executive Committee be instructed to discuss this matter with Colonel Morrow, with a view of upholding his hands so far as possible.

President W. M. Riggs of South Carolina then presented resolutions as follows:

*Resolved:* (1) That the Executive Committee be instructed actively to support the budget of the War Department in so far as this relates to the Reserve Officers' Training Corps.

(2) That the Executive Committee be instructed to call to the attention of the proper authorities in Washington the great desirability of retaining satisfactory officers as professors of military science and tactics for the full period allowable under the law and the War Department's rulings.

(3) That the Executive Committee be instructed to seek to bring about such necessary changes in the National Defense Act as will provide that Government property, stolen or destroyed while in the custody of a college, may be subject to the same rules governing liability as is Government property located at an army post or in the custody of an army officer.

(4) That the Executive Committee be instructed to endeavor to secure the enactment of legislation or the establishment of a ruling which will enable the War Department to assume the cost of the initial uniform and equipment for college officers entering the Officers' Reserve Corps.

On motion, the resolutions were adopted.

President Riggs then presented a resolution commendatory of the work of Colonel F. J. Morrow, as follows:

*Resolved:* That the Association of Land-Grant Colleges calls to the attention of the Honorable Secretary of War the efficient services of Colonel F. J. Morrow in promoting at the colleges represented in this association the interests of the Reserve Officers' Training Corps.

By his tact, good judgment, and sympathetic attitude, Colonel Morrow has been able to obtain that degree and quality of cooperation with our members so essential to the best results in the development of this important measure of National defense.

On motion, the resolution was adopted, and the secretary was instructed to transmit the same to the Secretary of War and to Colonel Morrow.

#### PUBLICATION OF COMMITTEE REPORTS

The reports of the Standing Committees on Instruction in Agriculture, Home Economics, and Mechanic Arts, on Experiment Station Organization and Policy, on Extension Organization and Policy and of the Joint Committees on Projects and Correlation of Research and Publication of Research, read in full and discussed before the appropriate sections and sub-sections and, in abbreviated form, before the general session, on motion, were received, filed, and ordered published in the proceedings of the association.

#### THE ROCKEFELLER GIFT

President W. E. Stone stated that no change has occurred in the status of this matter since the issuance of the statement in Bulletin 2.

#### PRESIDENT C. C. THACH

President W. M. Riggs of South Carolina presented the following resolution:

*Resolved:* That the Association of Land-Grant Colleges, noting the absence of Dr. Charles C. Thach from its thirty-fourth annual convention in Springfield, Massachusetts, and learning with regret that impaired health has compelled the termination of his long and successful presidency of the Alabama Polytechnic Institute, extends to Dr. Thach its warm regards and best wishes for a speedy and complete recovery.

On motion, the resolution was adopted and the secretary instructed to transmit the same to Dr. Thach.

#### RESOLUTION FROM THE SECTION OF AGRICULTURE

A resolution was received from the section of agriculture asking that all present standing committees dealing with agriculture be continued and that the office of bibliographer be re-established. (See p. 158.)

On motion, the resolutions were received and it was voted that the Director of the States Relations Service be asked to furnish annually for publication in the proceedings of the association such bibliographical statements dealing with agricultural matters as to him seem pertinent.

#### PROPOSED CONFERENCE OF EXTENSION WORKERS WITH THE UNITED STATES DEPARTMENT OF AGRICULTURE

Discussion was held as to the proposed extension conference during the coming winter at Washington. It was stated that following protest on the part of several institutional executives, the project had been abandoned and that regional conferences were proposed as substitutes.

#### REPORT OF NOMINATING COMMITTEE

The nominating committee, consisting of all past presidents of the association present at the convention, reported as follows:

President, Dean H. L. Russell of the University of Wisconsin; vice-president, President Howard Edwards of Rhode Island State College; secretary-treasurer, Dean J. L. Hills of the University of Vermont; Executive Committee, President R. A. Pearson of Iowa State College, President W. M. Riggs of Clemson College, President W. E. Stone of Purdue University, Dean A. R. Mann of New York State College of Agriculture, and Dean F. B. Mumford of the University of Missouri.

On motion, the report was accepted and adopted.

It was voted, on motion, that the president-elect, ineligible by virtue of his office to sit in the Executive Body, be invited to sit with and preside over it at the next convention.

#### RESOLUTIONS OF THANKS

On motion, the secretary was instructed to frame and to transmit resolutions of thanks and appreciation, which follow:

The Association of Land-Grant Colleges assembled at the thirty-fourth annual convention expresses to the Springfield Chamber of Commerce and to the officials of the Eastern States Exposition, warm appreciation of the efforts made in their behalf. Rarely, if ever, in its history of a third of a century has this organization been more heartily welcomed or more assid-

uously cared for. The hotel arrangements, the souvenir programs and badges, the excellent publicity secured through the Springfield Republican, Union, and News, the exceptional entertainment given by the Eastern States Exposition, have made this convention especially memorable.

The association also warmly thanks the officers of two of its constituent members, the Massachusetts Agricultural College and the Massachusetts Institute of Technology, for the courtesies shown on Friday, October twenty-second, in connection with the most enjoyable excursions to Amherst and to Boston.

The association is mindful of the reason why it meets in Massachusetts in 1920; of the ter-centenary of the landing of the Pilgrims; of the semi-centennial of the Massachusetts Agricultural College. We heartily congratulate that institution and its officers on the completion of 50 years of splendid achievement and confidently look forward to years, decades, and centuries of yet more effective service.

#### NEED OF INCREASED INCOME FOR AGRICULTURAL EXPERIMENT STATIONS

Dean A. R. Mann of New York State College of Agriculture briefly set forth the argument in favor of increased Federal appropriation in behalf of agricultural experiment stations. The recommendations were as follows.

It is recommended that the Executive Committee be instructed to take steps to secure additional funds from Congress for the agricultural experiment stations for research and investigation and that the legislation providing for such funds embody substantially the following principles:

(1) The amendment of the Hatch Act to provide for each agricultural experiment station an increase of \$15,000 for the first year and a subsequent increase by annual increments of \$10,000 until the total additional funds shall be \$85,000 per annum, exclusive of the original Hatch appropriation.

(2) That the appropriation provided, exclusive of the original Hatch appropriation, be contingent upon equivalent local appropriations being made in the several States.

(3) That the legislation be so drawn as to permit either the whole or any part of the additional appropriations to be available whenever equivalent offset appropriations are made by the States.

(4) That the administration of the funds provided shall follow substantially the method of administration now provided under the Hatch Act.

(5) Unless it should appear that under the terms of the Hatch Act, as at present drawn, the use of funds for investigation and research into the social, economic, and educational aspects of agriculture and home economics is permitted, the amendment should be so drawn as to include them.

A prolonged discussion followed. Among the points made and questions raised were: The inadvisability of making the initial new additional appropriation contingent on State appropriation, in which connection it was pointed out that the committee report did not represent a final judgment; the unique situation obtaining in New England due to Census interpretation of the phrase "rural population"; the fact that funds appropriated by the States for regulatory purposes could not be used as offset; the possible danger of attempting to amend the Hatch Act which might be disadvantageously modified if brought upon the floor of Congress; the advantages of amending the Hatch Act as compared with the Adams Act because the latter called for more fundamental research and is more closely restricted, whereas the scope of the former is much wider and administrative complications less evident; the pronounced feeling on every hand that the Hatch Act should be made the basis of increased appropriation; the fact that in many States the State appropriation in behalf of



agricultural research already in existence would in part or wholly meet the terms of the proposed bill; the fact that the proposed measure, calling for dollar for dollar offset, would be of little avail in the smaller States, already heavily loaded with the obligations of similar fifty-fifty laws, and that, consequently, the requirement that the initial new appropriation be matched, should be waived; the grave danger that new fifty-fifty requirements would result in the withdrawal in several States of State funds now appropriated in behalf of the instructional phases of land-grant college work; the conflict of research demands within the institutional cosmos, for agriculture, engineering, home economics and our duties toward all these lines; the advisability of seeking amendment only in so far as the amount of the appropriation is concerned, trusting to a more liberal interpretation of the phraseology which will permit work in agricultural economics, home economics, farm management, etc.; the doubt as to the advisability of approving item 5 of the committee report, unless present interpretations of the Hatch Act are somewhat liberalized; the wisdom of letting each tub stand upon its own bottom, and approaching Congress with separate measures in behalf of research for agriculture, for home economics, and for engineering; the doubt as to whether this is the psychological time to approach Congress; the peculiar opportuneness of the present time to secure appropriations in behalf of agricultural economics, and home economics; the hearty support likely to be furnished by the farm bureau organizations and the women's organizations for research along country life lines, and the wisdom of capitalizing their interests in these new and relatively neglected fields.

During the course of the discussion, resolutions from the sections of engineering and of home economics urging appropriation for experimentation were read.

Finally, on motion, it was voted that it was the sense of the Executive Body that the Executive Committee should seek to secure the passage during the coming session of Congress of suitable legislation which should appropriate to the agricultural experiment stations in the several States gradually increasing amounts of money which should not be subject to equivalent State appropriation, the amounts to be such as in the judgment of the Executive Committee were deemed wise, to be applied to research in agricultural economics, home economics and other country life subjects including research in agricultural production.

#### RESOLUTION FROM THE SECTION OF ENGINEERING REGARDING RESEARCH IN HIGHWAY ENGINEERING

The Section of Engineering presented a resolution reading as follows:

*Whereas:* The Federal Government and the States, counties, and municipalities of the country have undertaken the systematic development of highways, involving the annual expenditure of many hundreds of millions of dollars: and

*Whereas:* There is need for extensive scientific research in highway construction and transportation to insure the economical and effective utilization of public road funds:

*Therefore be it Resolved:* That the Association of Land-Grant Colleges instruct its Executive Committee to present to Congress the need for the appropriation of sufficient funds to enable the Secretary of Agriculture

to act in cooperation with existing research agencies in the several States and Territories in the prosecution of highway research.

*And be it further Resolved:* That the chairman of the Engineering Section be authorized to appoint a committee from the section to cooperate with the Executive Committee in the advancement of this important matter.

J. W. VOTEY,  
CALVIN H. CROUCH,  
C. R. RICHARD,  
*Committee.*

A prolonged discussion ensued, following which, on motion, the first paragraph of the resolutions was not adopted, but it was voted that the Executive Committee be instructed to cooperate with the Secretary of Agriculture in securing funds for research in highway engineering. The last paragraph of the resolutions was adopted.

#### COMMITTEE ON ENGINEERING EXPERIMENT STATIONS

Resolutions from the Section of Engineering, as given on page 192, were read and considered.

On motion, the recommendation for the appointment of a committee on engineering experiment stations was approved, the Executive Committee to determine the extent to which it would finance the committee. The president appointed Deans G. W. Bissell of Michigan, A. A. Potter of Indiana, and A. Marston of Iowa respectively for the three, two, and one year terms to serve with the secretary of the section, *ex officio*.

#### RECOMMENDATIONS FROM THE SECTION OF HOME ECONOMICS

Resolutions from the Section of Home Economics were presented as follows:

The Section of Home Economics begs to present to the Executive Body of the Association of Land-Grant Colleges the following recommendations for approval and action.

(1) That the proposed amendment to the Smith-Hughes Act providing for the equalization of the appropriation for home economics with agriculture and trades and industry, known as the Fess Bill, be endorsed and actively supported by the association.

(2) In view of the recognized necessity for home economics research, the Section of Home Economics asks that the Executive Committee formulate a bill covering the provisions of the Smoot Bill introduced into the last Congress, and urge its introduction and passage.

(3) In view of the relationship existing between the land-grant colleges and the Bureau of Education, and in view of the effective work heretofore done by the home economics specialists employed by the bureau, the Section of Home Economics asks that the Executive Committee recommend to the Secretary of the Interior that suitable financial provision be made in the Bureau of Education for developing and placing its home economics work on a permanent basis.

(4) In view of the increasing recognition of the need for home economics extension instruction and the fact that the funds now available for agricultural extension are insufficient to meet the demands made upon them, especially along home economics lines, the Section of Home Economics urges that increased Federal appropriation be sought for the purpose of extending subject matter in home economics and strengthening the organization work already in existence.

(5) In order that the Section of Home Economics may have the point of view and contact with the policies and organization of the association, as well as receive assistance in the solution of its administrative problems, it requests representation on the standing committees on Graduate Study, College Organization and Policy, Extension Organization and Policy, and Experiment Station Organization and Policy.

On motion, the recommendation in paragraph 1 was approved; that in paragraph 2 was laid on the table in view of the action previously taken (see p. 288); that in paragraph 3 was referred to the Executive Committee with power. On motion, the spirit of the recommendation embodied in paragraph 4 was approved, the same being referred to the secretary for clarification of its obscure language [this has been done in the text as given above. J. L. H.], and the recommendation was referred to the Executive Committee with power. On motion, the recommendation in paragraph 5 was laid on the table.

#### RECOMMENDATION FROM THE SECTION OF ENGINEERING

A request of the Section of Engineering touching proposed amendment of the Hatch Act, was received, reading as follows:

The Engineering Experiment Station Committee recommends to the Executive Body and the Executive Committee that if the Hatch Act is modified provision be made for the support of research related to the mechanic arts, and that the funds thus appropriated be expended under the direction of the division of mechanic arts of the land-grant institutions.

ANSON MARSTON,  
A. A. POTTER,  
R. L. SACKETT,  
C. R. JONES.

On motion, the matter was referred to the Executive Committee.

#### RECOMMENDATIONS OF THE COMMITTEE ON EXTENSION ORGANIZATION AND POLICY

This report (see p. 143) contained five recommendations, to wit:

- (1) The employment of full-time specialists.
- (2) Discouragement of the practice of payment of deans or subject-matter departmental heads in part from extension funds.
- (3) Seasonal program from specialists.
- (4) Prompt reports from directors.
- (5) A \$500 limitation on out-of-State travel on Smith-Lever funds.

A considerable discussion ensued in the course of which a strong protest was made against the alleged tendency of some extension directors to strike hands with States Relations Service officials in antagonism to the views of university and college executives. It was pointed out that the memorandums of understanding were drawn between the department and the college and signed by the president or dean, but that the latter were often ignored and matters of vital administrative importance determined by Washington authorities and extension directors over the heads of and without regard to the views of, and without consultation with, the executives. One speaker felt that the suggestion as to the \$500 travel limitation verged upon the impertinent and that the suggestion that the chiefs of

subject-matter divisions who exercised administrative control over extension subject-matter specialists and who use more or less of their time and effort in connection with extension activities in their particular fields, should not be paid from extension funds pro rata on an equitable basis, was palpably illogical. He consequently introduced the following resolutions:

*Resolved:* (1) That the Executive Body approve most heartily of the employment of specialists as a necessary reinforcement to county agent work.

(2) That the Executive Body disapproves the recommendation of the sub-section on extension work in so far as it relates to heads of subject-matter departments.

(3) That it is the point of view of the Executive Body that when, in the policy of a given institution, the head of a subject-matter department or division plans and supervises the three lines of service in his specialty, namely, extension, research, and resident teaching, his salary may properly be proportioned between extension, station, and college funds; that the amount of "actual field work" done by the subject-matter head in person is not the proper basis upon which to value his benefits to the extension service but rather that his value should be measured by the value of his plans and of the work accomplished by the extension specialists working under such plans, of which value the extension director of necessity must be the judge.

(4) That the Executive Committee be asked to consider the advisability of recommending to the Secretary of Agriculture that at the earliest practicable date the Office of Extension Work in the North and West, and the Office of Extension Work in the South, be combined into one office in order that a unified, non-sectional, and more efficient administration of the Smith-Lever Act may be secured.

(5) That the director of the States Relations Service be respectfully reminded that administrative plans for the conduct of extension work are matters to be decided upon between the college presidents and the representatives of the States Relations Service rather than between the extension directors and representatives of the States Relations Service.

(6) That the matter of the expenditure of Smith-Lever funds in connection with out-of-State travel is a detail of college administration properly to be decided upon by the president or the dean of the college of agriculture in consultation with the director of the extension service and not by the States Relations Service.

In the discussion which followed, resolutions 2 and 3 were objected to by two members on two grounds: namely, the difficulty of securing satisfactory division of salaries as between the three funds, and the unwisdom of the step. It was pointed out that the many quasi-valid ways of dipping into agricultural funds inevitably would lead to difficulties and that the satisfactory handling of extension projects would be interfered with.

On motion, resolutions 1, 4, 5 and 6 were unanimously adopted and resolutions 2 and 3 adopted with one dissenting vote, that of President K. L. Butterfield of Massachusetts Agricultural College, who desires thus to be recorded.

#### TEMPORARY FUNDS

On motion, the question of the advisability of the establishment of an additional agency to deal with temporary funds was left for the Executive Committee to consider and to report upon.

## SMITH-TOWNER BILL

The special committee on the Smith-Towner Bill (see Bulletin 2, item 7) reported as follows:

Your committee appointed to consider and report upon the question of the relations of the land-grant colleges to the measure known as the Smith-Towner Bill and to recommend a policy in connection therewith, begs to submit the following report:

Concerning the general purpose of the bill "to encourage the States in the promotion and support of education" and more specifically to provide for the "preparation of teachers; equalizing educational opportunities; physical and health education; Americanization; removal of illiteracy; and the organization by the Federal Government of a strong, central department of education in which real leadership of the Nation's educational agencies shall be developed," there can be no difference of opinion. These aims are to be sought and supported by all who have the interests of education at heart.

The members of the committee differ among themselves on the question as to the desirability of making the head of the proposed Federal educational department a member of the President's cabinet, objections being based on the fact that this office is political and temporary, whereas educational leadership should be permanent and non-political.

The committee entertains the profound conviction that under no circumstances can it approve of legislation which might result in giving Federal authority control over the educational systems of the respective States either directly or indirectly. In its present form the bill specifically provides that all of the educational facilities provided for shall be "organized, supervised, and administered exclusively by the legally constituted State and local educational authorities," and that the proposed Secretary of Education "shall exercise no authority in relation thereto except as herein provided to insure that all funds apportioned to (the States) shall be used for the purposes for which they are appropriated." The authors of the bill are emphatic in their assurances that it has been their purpose to safeguard this point and, as the bill now stands, your committee believes this has been accomplished.

The proposed legislation contains a provision which is potentially of the utmost importance to the land-grant colleges to which the committee desires to call the careful attention of the members of this association. Section 3 provides that "the President is authorized and empowered in his discretion to transfer to the Department of Education such offices, bureaus, divisions, boards or branches of the Government, connected with or attached to any of the executive departments or organized independently of any department, as in his judgment should be controlled by, or the functions of which should be exercised by, the Department of Education."

Under this provision, it would be possible to transfer the land-grant colleges and all their activities, including research and extension, to the proposed new department, thus severing completely the relations under which for more than 50 years our institutions have so happily and successfully developed. The possibility of such a result may well occasion apprehension in our minds and should, in the opinion of the committee, stimulate such action by this association as will tend to avoid such a contingency.

Your committee would, therefore, recommend the adoption of the following statement as an expression of the attitude of this association towards the proposed legislation:

(1) We approve the general purposes of the bill relating to the encouragement of education.

(2) We favor national leadership of, and financial assistance to, public education.

(3) We oppose Federal control of State and local education.

(4) Since the land-grant colleges are higher institutions of learning established on Federal and State statutes and have maintained satisfactory relations with the Federal Department of Agriculture now well established

by more than 50 years of successful operation, we favor such guaranties as will safeguard these relationships.

W. E. STONE, Chairman.  
SAMUEL AVERY,  
W. J. KERR,  
K. L. BUTTERFIELD,  
L. D. COFFMAN.

Considerable discussion ensued on the matter of the endorsement of the Smith-Towner Bill. It developed that the committee's report was in the nature of a compromise of divergent opinions and that it represented the result of several hours of deliberation. Among the points brought out in the discussion were: That much more opposition to the bill was manifest than was admitted by its protagonists; that much of the endorsement it had heretofore received was proffered by those who had not clearly thought out the proposed measure in all its implications and was due to a sentimental wave of enthusiasm; that it was seriously inconsistent in many places; that further safeguards were needed in the interest of local autonomy.

It was proposed, on motion, to amend the committee's report by adding a clause to the effect that serious inconsistencies existed in the proposed measure which should be corrected, and by making it clear that the association did not approve so large a draft upon the public treasury as was called for by this measure. This motion was combated on the ground that the first proposal got nowhere and that the second was too drastic; also on the ground that it constituted quasi-approval. It was pointed out further that whatever statement was made by the association should be brief and carefully worded so that its purport could be neither misunderstood nor misused.

On motion, the report was adopted.

On motion, the Executive Body adjourned *sine die*.



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# **PROCEEDINGS**

OF THE

THIRTY-FIFTH ANNUAL CONVENTION  
OF THE

## **Association of LAND-GRANT COLLEGES**

Held AT

NEW ORLEANS, LA., NOVEMBER 8-10, 1921

---

Edited by W. H. BEAL  
For the Executive Committee of the Association



**Adjourned.**

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- IDAHO—UNIVERSITY OF IDAHO, Moscow. A. H. Upham, *President*; E. J. Iddings, *Dean College of Agriculture, Director Experiment Station*; L. W. Fluharty, *Director Extension Division (Boise)*; C. N. Little, *Dean College of Engineering*; Katherine Jensen, *Professor of Home Economics*.
- ILLINOIS—UNIVERSITY OF ILLINOIS, Urbana. D. Kinley, *President*; E. Davenport, *Dean College of Agriculture, Director Agricultural Experiment Station, Director Extension Service*; W. F. Handschin, *Vice-Director Extension Service*; C. R. Richards, *Dean College of Engineering, Director Engineering Experiment Station*; Ruth A. Wardall, *Head Department of Home Economics*.
- INDIANA—PURDUE UNIVERSITY, LaFayette. ———, *President*; J. H. Skinner, *Dean School of Agriculture*; G. I. Christie, *Director Agricultural Experiment Station, Director Department of Agricultural Extension*; A. A. Potter, *Dean Schools of Engineering, Director Engineering Experiment Station*; Mary L. Matthews, *Head Department of Home Economics*.
- IOWA—IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Ames. R. A. Pearson, *President*; C. F. Curtiss, *Dean Division of Agriculture, Director Agricultural Experiment Station*; R. K. Bliss, *Director Agricultural Extension*; A. Marston, *Dean Division of Engineering, Director Engineering Experiment Station*; Edna E. Walls, *Acting Dean Division of Home Economics*.
- KANSAS—KANSAS STATE AGRICULTURAL COLLEGE, Manhattan. W. M. Jardine, *President*; F. D. Farrell, *Dean Division of Agriculture, Director Agricultural Experiment Station*; Harry Umberger, *Dean Extension Division*; R. A. Seaton, *Dean Division of Engineering and Director Engineering Experiment Station*; Helen B. Thompson, *Dean Division of Home Economics*.
- KENTUCKY—THE UNIVERSITY OF KENTUCKY, Lexington. F. L. McVey, *President*; T. P. Cooper, *Dean College of Agriculture, Director Experiment Station, Director Agricultural Extension*; F. P. Anderson, *Dean College of Engineering*; L. Maybelle Cornell, *Head Department of Home Economics*.  
 THE KENTUCKY NORMAL AND INDUSTRIAL INSTITUTE FOR COLORED PERSONS, Frankfort. G. P. Russell, *President*.
- LOUISIANA—LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, Baton Rouge. T. D. Boyd, *President*; W. R. Dodson, *Dean College of Agriculture, Director Experiment Stations*; W. R. Perkins, *Director Agricultural Extension Department*; T. W. Atkinson, *Dean College of Engineering*; Mattie R. Sebastian, *Director of Home Economics*.

- SOUTHERN UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE OF THE STATE OF LOUISIANA, *Scotlandville*. J. S. Clark, *President*.
- MAINE—UNIVERSITY OF MAINE, *Orono*. C. A. Little, *President*; L. S. Merrill, *Dean College of Agriculture, Director Agricultural Extension Service*; W. J. Morse, *Director Experiment Station*; H. S. Boardman, *Dean College of Technology*; Frances R. Freeman, *Head Department of Home Economics*.
- MARYLAND—UNIVERSITY OF MARYLAND, *College Park*. A. F. Woods, *President*; P. W. Zimmerman, *Dean College of Agriculture*; H. J. Patterson, *Director Experiment Station*; T. B. Symons, *Director of Extension Service*; A. N. Johnson, *Dean College of Engineering*; M. Marie Mount, *Acting Dean College of Home Economics*.
- PRINCESS ANNE ACADEMY FOR COLORED PERSONS, EASTERN BRANCH OF UNIVERSITY OF MARYLAND, *Princess Anne*. J. O. Spencer, *President (Baltimore)*; T. H. Kiah, *Principal*.
- MASSACHUSETTS—MASSACHUSETTS AGRICULTURAL COLLEGE, *Amherst*. K. L. Butterfield, *President*; S. B. Haskell, *Director Experiment Station*; J. D. Willard, *Director Extension Service*; Edna L. Skinner, *Head Department of Home Economics*.
- MASSACHUSETTS INSTITUTE OF TECHNOLOGY, *Cambridge*. Elihu Thomson, *Acting President*.
- MICHIGAN—MICHIGAN AGRICULTURAL COLLEGE, *East Lansing*. David Friday, *President*; R. S. Shaw, *Dean of Agriculture, Director Experiment Station*; R. J. Baldwin, *Director of Extension Work*; G. W. Bissell, *Dean of Engineering*; Mary E. Sweeny, *Dean of Home Economics*.
- MINNESOTA—UNIVERSITY OF MINNESOTA, *Minneapolis*. L. D. Coffman, *President*. DEPARTMENT OF AGRICULTURE, *University Farm, St. Paul*: W. C. Coffey, *Dean Department of Agriculture, Director Experiment Station*; E. M. Freeman, *Dean College of Agriculture, Forestry and Home Economics*; F. W. Peck, *Director Agricultural Extension*; Ora M. Leland, *Dean College of Engineering*; Mildred Weigley, *Chief Division of Home Economics*.
- MISSISSIPPI—MISSISSIPPI AGRICULTURAL AND MECHANICAL COLLEGE, *Agricultural College*. D. C. Hull, *President*; J. C. Robert, *Dean School of Agriculture*; J. R. Ricks, *Director Experiment Stations*; R. S. Wilson, *Director Extension Work*; B. M. Walker, *Director School of Engineering*.
- ALCORN AGRICULTURAL AND MECHANICAL COLLEGE, *Alcorn*. L. J. Rowan, *President*.
- MISSOURI—UNIVERSITY OF MISSOURI, *Columbia*. J. C. Jones, *President*; F. B. Mumford, *Dean College of Agriculture, Director Agricultural Experiment Station*; A. J. Meyer, *Director Extension Service*; E. J. McCaustland, *Dean School of Engineering, Director Engineering Experiment Station*; Louise Stanley, *Chairman Department of Home Economics*.
- LINCOLN UNIVERSITY, *Jefferson City*. C. Richardson, *President*.
- MONTANA—MONTANA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, *Bozeman*. A. Atkinson, *President*; F. B. Linfield, *Dean of Agriculture, Director Experiment Station*; F. S. Cooley, *Director Extension Service*; E. B. Norris, *Dean of Engineering*; Gladys Branegan, *Professor of Home Economics*.

NEBRASKA—UNIVERSITY OF NEBRASKA, *Lincoln*. Samuel Avery, *Chancellor*; E. A. Burnett, *Dean College of Agriculture, Director Experiment Station*; W. H. Brokaw, *Director Agricultural Extension Service*; Olin J. Ferguson, *Dean College of Engineering*; Margaret S. Fedde, *Chairman Department of Home Economics*.

NEVADA—UNIVERSITY OF NEVADA, *Reno*. W. E. Clark, *President*; Robert Stewart, *Dean College of Agriculture*; S. B. Doten, *Director Experiment Station*; C. W. Creel, *Director Agricultural Extension*; F. H. Sibley, *Dean College of Engineering*; Sarah L. Lewis, *Professor of Home Economics*.

NEW HAMPSHIRE—NEW HAMPSHIRE COLLEGE OF AGRICULTURE AND THE MECHANIC ARTS, *Durham*. R. D. Hetzel, *President*; J. C. Kendall, *Director Experiment Station, Director Extension Service*; F. W. Taylor, *Dean Agricultural Division*; C. H. Crouch, *Dean Engineering Division*; Mrs. Helen F. McLaughlin, *Acting Head Department of Home Economics*.

NEW JERSEY—RUTGERS COLLEGE AND THE STATE UNIVERSITY OF NEW JERSEY, *New Brunswick*. W. H. S. Demarest, *President*; J. G. Lipman, *Dean of Agriculture, Director College and State Agricultural Experiment Stations*; L. A. Clinton, *Director Division of Extension in Agriculture and Home Economics*; R. C. H. Heck, *Acting Dean of Engineering*; Frances H. Tomer, *Head Department of Home Economics*.

NEW MEXICO—NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS, *State College*. H. L. Kent, *President, and Dean School of Agriculture*; F. Garcia, *Director Experiment Station*; C. F. Monroe, *Director Extension Service*; R. W. Goddard, *Dean School of Engineering*; Blanche Gillmore, *Professor of Home Economics*.

NEW YORK—CORNELL UNIVERSITY, *New York State College of Agriculture, Ithaca*. Livingston Farrand, *President of University*; A. R. Mann, *Dean College of Agriculture, Director (Cornell) Experiment Station and Extension Service*; Cornelius Betten, *Vice-Dean of Resident Instruction*; W. H. Chandler, *Vice-Director of Research*; M. C. Burritt, *Vice-Director of Extension*; D. S. Kimball, *Dean College of Engineering*; Martha Van Rensselaer and Flora Rose, *in charge Department of Home Economics*.

NEW YORK STATE AGRICULTURAL EXPERIMENT STATION, *Geneva*. R. W. Thatcher, *Director*.

NORTH CAROLINA—THE NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, *Raleigh*. W. C. Riddick, *President*; C. B. Williams, *Dean of Agriculture*; B. W. Kilgore, *Director Agricultural Experiment Station, Director Extension Service*.

THE NEGRO AGRICULTURAL AND TECHNICAL COLLEGE, *Greensboro*. J. B. Dudley, *President*.

NORTH DAKOTA—NORTH DAKOTA AGRICULTURAL COLLEGE, *Agricultural College*. J. L. Coulter, *President*; C. B. Waldron, *Dean School of Agriculture*; P. F. Trowbridge, *Director Experiment Station*; G. W. Randlett, *Director Extension Work*; E. S. Keene, *Dean School of Mechanic Arts*; Alba Bales, *Dean School of Home Economics*.

OHIO—OHIO STATE UNIVERSITY, *Columbus*. W. O. Thompson, *President*; Alfred Vivian, *Dean College of Agriculture*; H. C. Ramsower, *Director*.

*Agricultural Extension Work*; E. A. Hitchcock, *Dean College of Engineering*; Faith R. Lanman, *Head Home Economics Department*.  
OHIO AGRICULTURAL EXPERIMENT STATION, Wooster. C. G. Williams, *Director*.

OKLAHOMA—OKLAHOMA AGRICULTURAL AND MECHANICAL COLLEGE, *Stillwater*. J. B. Eskridge, *President*; M. A. Beeson, *Dean of Agricultural Division*; C. T. Dowell, *Director Experiment Station*; W. A. Conner, *Director of Extension*; R. G. Tyler, *Dean School of Engineering*; Ella N. Miller, *Dean School of Home Economics*.

COLORADO AGRICULTURAL AND NORMAL UNIVERSITY, *Langston*. J. M. Marquess, *President*.

OREGON—OREGON AGRICULTURAL COLLEGE, *Corvallis*. W. J. Kerr, *President*; A. B. Cordley, *Dean School of Agriculture*; J. T. Jardine, *Director Experiment Station*; Paul V. Maris, *Director Extension Service*; G. A. Covell, *Dean School of Engineering and Mechanic Arts*; Ava B. Milam, *Dean School of Home Economics*.

PENNSYLVANIA—THE PENNSYLVANIA STATE COLLEGE, *State College*. J. M. Thomas, *President*; R. L. Watts, *Dean School of Agriculture*, *Director Agricultural Experiment Station*; M. S. McDowell, *Director Agricultural Extension*; R. L. Sackett, *Dean School of Engineering*, *Director Engineering Experiment Station*; Edith P. Chace, *Director of Home Economics*.

PORTO RICO—UNIVERSITY OF PORTO RICO, *Rio Piedras*, and COLLEGE OF AGRICULTURE AND MECHANIC ARTS, *Mayaguez*. J. B. Huyke, *Chancellor*; C. E. Horne, *Dean College of Agriculture*.

RHODE ISLAND—RHODE ISLAND STATE COLLEGE, *Kingston*. H. Edwards, *President*; G. E. Adams, *Dean Department of Agriculture*; B. L. Hartwell, *Director Experiment Station*; A. E. Stene, *Director Extension Service*; R. L. Wales, *Dean Department of Engineering*; Alice L. Edwards, *Head Department of Home Economics*.

SOUTH CAROLINA—CLEMSON AGRICULTURAL COLLEGE OF SOUTH CAROLINA, *Clemson College*. W. M. Riggs, *President*; F. H. H. Calhoun, *Director of Resident Teaching*; H. W. Barre, *Director Experiment Station*; W. W. Long, *Director Extension Service*; S. B. Earle, *Director Engineering Department*.

STATE AGRICULTURAL AND MECHANICAL COLLEGE OF SOUTH CAROLINA, *Orangeburg*. R. S. Wilkinson, *President*.

SOUTH DAKOTA—SOUTH DAKOTA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, *Brookings*. W. E. Johnson, *President*; J. W. Wilson, *Director Experiment Station*; W. F. Kumlien, *Acting Director of Extension Division*; H. C. Solberg, *Head Department of Engineering*; Edith Pierson, *Professor of Home Economics*.

TENNESSEE—THE UNIVERSITY OF TENNESSEE, *Knoxville*. H. A. Morgan, *President*, *Dean College of Agriculture*, *Director Experiment Station*; C. A. Willson, *Vice-Dean College of Agriculture*; C. A. Mooers, *Vice-Director Experiment Station*; C. A. Keffer, *Director Division of Agricultural Extension*; C. E. Ferris, *Dean College of Engineering*; Nellie Crooks, *Director of Home Economics Department*.

AGRICULTURAL AND INDUSTRIAL STATE NORMAL SCHOOL FOR NEGROES, *Nashville*. W. J. Hale, *President*.

TEXAS—AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, *College Station*. W. B. Bizzell, *President*; E. J. Kyle, *Dean School of Agriculture*; B. Youngblood, *Director Agricultural Experiment Station*; T. O. Walton, *Director Extension Service*; J. C. Nagle, *Dean School of Engineering, Director Engineering Experiment Station*.

PRAIRIE VIEW STATE NORMAL AND INDUSTRIAL COLLEGE, *Prairie View*. J. G. Osborne, *Principal*.

UTAH—AGRICULTURAL COLLEGE OF UTAH, *Logan*. E. G. Peterson, *President*; G. R. Hill, Jr., *Director School of Agriculture*; William Peterson, *Director Agricultural Experiment Station*; R. J. Evans, *Director Extension Division*; R. B. West, *Director Schools of Agricultural Engineering and Mechanic Arts, Director Agricultural Engineering Experiment Station*; Jessie Whitacre, *Director School of Home Economics*.

VERMONT—UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE, *Burlington*. G. W. Bailey, *President*; J. L. Hills, *Dean College of Agriculture, Director Experiment Station*; Thomas Bradlee, *Director Extension Service*; J. W. Votey, *Dean College of Engineering*; Bertha M. Terrill, *Professor of Home Economics*.

VIRGINIA—VIRGINIA AGRICULTURAL AND MECHANICAL COLLEGE AND POLYTECHNIC INSTITUTE, *Blacksburg*. J. A. Burruss, *President*; H. L. Price, *Dean School of Agriculture*; A. W. Drinkard, Jr., *Director Experiment Station*; J. R. Hutcheson, *Director Extension Division*; S. R. Pritchard, *Dean School of Engineering*.

VIRGINIA NORMAL AND INDUSTRIAL INSTITUTE, *Petersburg*. J. M. Gandy, *President*; G. W. Owens, *Director Agricultural School*.

WASHINGTON—STATE COLLEGE OF WASHINGTON, *Pullman*. E. O. Holland, *President*; E. C. Johnson, *Dean College of Agriculture, Director Agricultural Experiment Station*; S. B. Nelson, *Dean and Director Extension Service*; H. V. Carpenter, *Dean College of Mechanic Arts and Engineering, Director Engineering Experiment Station*; Florence Harrison, *Dean College of Home Economics*.

WEST VIRGINIA—WEST VIRGINIA UNIVERSITY, *Morgantown*. F. B. Trotter, *President*; ———, *Dean College of Agriculture*; H. G. Knight, *Director Experiment Station*; N. T. Frame, *Director Extension Division*; C. R. Jones, *Dean College of Engineering*; Rachel H. Colwell, *Professor of Home Economics*.

THE WEST VIRGINIA COLLEGIATE INSTITUTE, *Institute*. J. W. Davis, *President*; A. W. Curtis, *Director Agricultural Department*.

WISCONSIN—UNIVERSITY OF WISCONSIN, *Madison*. E. A. Birge, *President*; H. L. Russell, *Dean College of Agriculture, Director Experiment Station, Director Agricultural Extension Service*; J. A. James, *Assistant Dean College of Agriculture*; F. B. Morrison, *Assistant Director Experiment Station*; K. L. Hatch, *Assistant Director Extension Service*; F. E. Turneure, *Dean College of Engineering*; Abby L. Marlatt, *Chairman Department of Home Economics*.

WYOMING—UNIVERSITY OF WYOMING, *Laramie*. Aven Nelson, *President*; A. D. Faville, *Dean College of Agriculture, Director Experiment Station*; A. E. Bowman, *Director Agricultural Extension*; E. G. Hoefler, *Professor of Mechanical and Electrical Engineering*; Greta Gray, *Head Department of Home Economics*.

## List of Delegates in Attendance

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ALABAMA: Spright Dowell, Dan T. Gray, L. N. Duncan, M. T. Fullan, J. F. Duggar, M. J. Funchess, E. R. Miller, I. T. Quinn.

ARIZONA: D. W. Working, J. J. Thornber, W. M. Cook.

ARKANSAS: J. C. Futrall, Bradford Knapp, W. N. Gladson, Martin Nelson, Stella Palmer, Connie J. Bonslagel, H. K. Thatcher.

CALIFORNIA: B. I. Wheeler, C. M. Haring, B. H. Crocheron.

COLORADO: C. A. Lory, C. P. Gillette, Roud McCann, E. P. Sandsten.

CONNECTICUT: C. L. Beach, E. H. Jenkins, H. J. Baker.

DELAWARE: Walter Hullihen, C. A. McCue, G. L. Schuster.

FLORIDA: A. A. Murphree, Wilmon Newell, J. R. Benton, A. P. Spencer, Sarah W. Partridge, J. M. Scott.

GEORGIA: A. M. Soule, J. P. Campbell, Mary E. Creswell, J. R. Fain.

IDAHO: A. H. Upham, E. J. Iddings, L. W. Fluharty.

ILLINOIS: David Kinley, C. R. Richards, W. F. Handschin, W. L. Burlyson, Ruth A. Wardall, Juliet Lita Bane, Lloyd Morey.

INDIANA: G. I. Christie, A. A. Potter, M. L. Fisher.

IOWA: R. A. Pearson, C. F. Curtiss, R. K. Bliss, Anson Marston, Edna E. Walls.

KANSAS: W. M. Jardine, F. D. Farrell, H. Umberger, R. A. Seaton, Helen B. Thompson.

KENTUCKY: F. L. McVey, T. P. Cooper, George Roberts, T. R. Bryant, L. Maybelle Cornell.

LOUISIANA: T. D. Boyd, W. R. Dodson, C. E. Coates, T. W. Atkinson, W. R. Perkins, W. C. Abbott, Mattie R. Sebastian, Norma Overbey.

MAINE: W. J. Morse.

MARYLAND: T. B. Symons, A. N. Johnson, H. F. Cotterman, A. G. McCall.

MASSACHUSETTS: E. M. Lewis, S. B. Haskell, J. D. Willard.

MICHIGAN: R. S. Shaw, R. J. Baldwin, G. W. Bissell, E. E. Gallup, Mary E. Sweeny.

MINNESOTA: L. D. Coffman, W. C. Coffey, F. W. Peck, O. M. Leland, Mildred Weigley.

MISSISSIPPI: D. C. Hull, J. R. Ricks, R. S. Wilson, J. W. Willis, Susie V. Powell.

MISSOURI: F. B. Mumford, M. F. Miller, A. J. Meyer, W. C. Etheridge.

MONTANA: E. C. Elliott, Alfred Atkinson, F. B. Linfield.

NEBRASKA: Samuel Avery, E. A. Burnett, W. H. Brokaw, O. J. Ferguson, Margaret S. Fedde.

NEVADA: W. E. Clark.

NEW HAMPSHIRE: R. D. Hetzel, J. C. Kendall.

NEW JERSEY: J. G. Lipman, L. A. Clinton, Carl R. Woodward.

NEW MEXICO: H. L. Kent, Fabian Garcia, C. F. Monroe, R. W. Goddard, L. H. Hauter.

NEW YORK: A. R. Mann, R. W. Thatcher, M. C. Burritt, W. H. Chandler, Martha Van Rensselaer, D. J. Crosby, T. H. Eaton.



- NORTH CAROLINA:** W. C. Riddick, B. W. Kilgore, C. B. Williams, M. E. Sherwin.
- NORTH DAKOTA:** J. L. Coulter, P. F. Trowbridge, G. W. Randlett, E. S. Keene.
- OHIO:** W. O. Thompson, Alfred Vivian, C. G. Williams, H. C. Ramsower, Faith R. Lanman.
- OKLAHOMA:** J. B. Eskridge, M. A. Beeson, C. T. Dowell, W. A. Conner, W. D. Bentley, M. J. Otey.
- OREGON:** J. T. Jardine, Paul V. Maris.
- PENNSYLVANIA:** J. M. Thomas, R. L. Watts, M. S. McDowell, R. L. Sackett.
- RHODE ISLAND:** Howard Edwards, B. L. Hartwell, A. E. Stene.
- SOUTH CAROLINA:** W. M. Riggs, H. W. Barre, W. W. Long, F. H. H. Calhoun.
- SOUTH DAKOTA:** Willis E. Johnson, W. F. Kumlien.
- TENNESSEE:** H. A. Morgan, C. A. Mooers, C. A. Keffer, N. E. Fitzgerald, C. E. Brehm, C. A. Willson, Margaret A. Ambrose.
- TEXAS:** W. B. Bizzell, E. J. Kyle, J. C. Nagle, B. Youngblood, T. O. Walton, W. B. Lanham, C. E. Friley, A. H. Leidigh, Laura F. Neale, J. T. Davis, M. L. Williams.
- UTAH:** E. G. Peterson, William Peterson.
- VERMONT:** J. L. Hills, Thomas Bradlee, J. W. Votey.
- VIRGINIA:** J. R. Hutcheson.
- WASHINGTON:** E. O. Holland, Edward C. Johnson, S. B. Nelson.
- WEST VIRGINIA:** F. B. Trotter, N. T. Frame, C. R. Jones.
- WISCONSIN:** E. A. Birge, H. L. Russell, K. L. Hatch, Abby L. Marlatt, F. E. Turneare, F. B. Morrison.
- WYOMING:** Aven Nelson, A. D. Faville, A. E. Bowman.

# Constitution

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## NAME

This Association shall be called the Association of Land-Grant Colleges.

## OBJECT

The object of this Association shall be the consideration and discussion of all questions pertaining to the successful progress and administration of the institutions included in the Association, and to secure to that end mutual cooperation.

## MEMBERSHIP

(1) Every college established under the Act of Congress approved July 2, 1862, or receiving the benefits of the Act of Congress approved August 30, 1890, shall be eligible to membership in this Association, provided that any agricultural experiment station not now connected with one of the above named colleges, but receiving the benefits of the Act of Congress approved March 2, 1887, shall also be eligible to membership.

(2) Any institution a member of this Association in full standing may send any number of delegates to the annual convention of the Association.

(3) Delegates from other institutions engaged in educational or experimental work in the interest of agriculture or mechanic arts may, by a majority vote, be admitted to conventions of the Association with all privileges except the right to vote.

(4) In like manner, any person engaged or directly interested in agriculture or mechanic arts who shall attend any convention of this Association may be admitted to similar privileges.

## SECTIONS

(1) The executive body of the Association shall consist of the presidents or executive officers of the institutions having membership in the Association. The executive body shall be the legislative branch of the Association.

(2) Sections shall consist of the following: A section of agriculture; a section of engineering; a section of home economics; and such other sections as may from time to time be approved by the executive body.

The sections shall communicate their recommendations and reports to the general session which shall in turn report to the executive body.

The membership of the sections shall consist respectively of the directors, deans, or other administrative heads of these respective departments or divisions of the institutions having membership in the Association and of similar divisions of the United States Department of Agriculture and the Federal Bureau of Education.

#### MEETINGS

(1) This Association shall hold at least one meeting in every calendar year, to be designated as the annual convention of the Association. Special meetings may be held at other times, upon the call of the Executive Committee, for purposes to be specified in the call.

(2) The annual convention of the Association shall comprise one or more meetings of the executive body to which shall be referred all business of the convention requiring legislative action.

Meetings of the sections for the discussion of matters pertaining to their respective lines of work shall be provided for in the convention program.

General meetings of the convention shall be held as designated by the Executive Committee.

#### OFFICERS

(1) The officers of the Association shall consist of a president, vice-president, and secretary-treasurer, to be chosen by the executive body.

(2) Each section shall elect its chairman and secretary.

(3) An executive committee of five members shall be chosen by the executive body, of which committee three members shall be chosen from the executive body and the remainder at large.

#### DUTIES OF OFFICERS

(1) The officers of the Association shall perform the duties which usually devolve upon their respective offices.

(2) The president shall deliver an address at the annual convention before the Association in general session.

(3) The Executive Committee shall determine the time and place of the annual conventions and other meetings of the Association, and shall, between such conventions and meetings, act for the Association in all matters of business. It shall issue its call for the annual conventions of the Association not less than sixty days before the date on which they are to be held, and for special meetings not less than ten days before such date. It shall be charged with the general arrangement and conduct of all meetings called by it. It shall designate the time and place of the convention. It shall present a well-prepared order of business, of subjects for discussion, and shall provide and arrange for the meetings of the several sections. The subjects provided for consideration by each section at any convention of the Association shall concentrate the deliberations of the sections upon not more than two lines of discussion, which lines, as far as possible, shall be related. Not more than one-third of the working time of any annual convention of the Association shall be confined to miscellaneous business.

#### FINANCES

At every annual convention the Association shall provide for obtaining the funds necessary for its legitimate expenses, and may, by appropriate action, call for contributions upon the several institutions eligible to membership; and no institution shall be entitled to representation or participation in the benefits of the Association unless such institution shall have

made the designated contribution for the year previous to that in and for which such question of privilege shall arise, or shall have said payment remitted by the unanimous vote of the Executive Committee.

#### AMENDMENTS

This constitution may be amended at any regular convention of the Association by a two-thirds vote of the executive body, if the number present constitute a quorum of the membership: *Provided*, that notice of any proposed amendment, together with the full text thereof and the name of the mover, shall have been given at the next preceding annual convention and repeated in the call for the convention. Every such proposition of amendment shall be subject to modification or amendment in the same manner as other propositions, and the final vote on the adoption or rejection shall be taken by yeas and nays of the institutions then and there represented.

#### RULES OF ORDER

(1) The Executive Committee shall be charged with the order of business, subject to special action of the Association, and this committee may report at any time.

(2) All business or topics proposed for discussion and all resolutions submitted for consideration of the Association shall be read and then referred, without debate, to the Executive Committee, to be assigned positions on the program.

(3) Speakers invited to open discussion shall be entitled to twenty minutes each.

(4) In general discussions the ten-minute rule shall be enforced.

(5) No speaker shall be recognized a second time on any one subject while any delegate who has not spoken desires to do so.

(6) The hours of meeting and adjournment adopted with the general program shall be closely observed, unless changed by a two-thirds vote of the delegates present.

(7) The presiding officer shall enforce the parliamentary rules usual in such assemblies and not inconsistent with the foregoing.

(8) Vacancies which may arise in the membership of standing committees by death, resignation, or separation from the Association of members shall be filled by the committees respectively.



# **Proceedings of the Thirty-Fifth Annual Convention of the Association of Land-Grant Colleges**

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## **MINUTES OF THE GENERAL SESSIONS<sup>1</sup>**

**TUESDAY EVENING, NOVEMBER 8, 1921**

The convention was called to order (in joint session with the National Association of State Universities) at 8 P. M., by the president of the latter organization, President E. A. Birge, University of Wisconsin.

W. R. Dodson, on behalf of the Governor of the State and Louisiana State University, welcomed the association to New Orleans.

The Secretary of Agriculture, Henry C. Wallace, who was unable to be present, sent the following letter:

### **LETTER OF THE SECRETARY OF AGRICULTURE**

**DEPARTMENT OF AGRICULTURE  
WASHINGTON, D. C.**

**November 5, 1921.**

**DEAR DR. PEARSON:**

I find it necessary to write you that I shall not be able to go to New Orleans. I regret this very much. I have been looking forward to this meeting and had made all my plans to attend. I wanted to avail myself of the opportunity to come in closer contact with the officers of the various land-grant colleges, and especially because I feel the urgent need of this contact if I am to succeed in administering this great Department as it should be administered. Matters have come up here, however, which seem to make it imperative that I remain in Washington this coming week, and I am writing to ask you to express my very great regret that I am to be deprived of the inspiration which would come from meeting with you.

You are meeting at a time of the most severe agricultural depression we have ever experienced. Most of us can remember times when prices of the principal farm products were lower than they are now as measured in dollars and cents, but I think our history does not record a time when prices of farm products were so low as compared with the cost of production or so low as compared with the cost of things the farmer has to buy. This has brought about a condition of great peril, not only to our agriculture but to our industrial, commercial, and general business life.

I know that it has been the custom at these annual meetings to give most of the time to the discussion of methods of instruction, experimentation, extension, and administration, and very properly. Present economic conditions, however, are so serious that I trust some considerable time will be given by those who are attending this meeting to the consideration of these conditions, not only as they affect the present, but as they are

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<sup>1</sup> All sessions were held at Hotel Grunewald.

likely to affect the future of our agriculture. The farmers of the country need the counsel of trained thinkers who are in thorough sympathy and understanding with agriculture and who are capable of reaching an understanding of the fundamental problems involved and of mapping out a program directed toward an intelligent and practical solution of our difficulties. In all such times we have the superficial thinkers coming forward with quack cures which too often do the patient more harm than good.

It seems to me that when we work through this period of severe stress we shall find ourselves at the beginning of a new era in agriculture in the United States, and this will present for solution new problems of vast importance. Heretofore the Department of Agriculture, the agricultural colleges and experiment stations, the agricultural press, and indeed all of the agencies which try to serve agriculture, have placed the greatest emphasis upon production and the improvement of production methods. I am convinced that the time has come when equal emphasis should be placed upon economic questions, marketing, the intelligent adjustment of production to the needs of consumption, an improved system of credit adjusted to the peculiar needs of the farmer, etc. I do not mean to suggest that there should be any lessening in our efforts to increase production, and especially to cheapen production costs, but I would add to these efforts equal attention to what I may call the business side of agriculture. This will involve a strengthening of courses in agricultural economics in the various land-grant colleges. In speaking at New Orleans it was my purpose to bring these matters as strongly as I could to the attention of the people gathered there.

I had hoped also to tell of what we have been trying to do here in the department during the past seven months. As you know, we are re-organizing our work in agricultural economics by combining the Bureau of Crop Estimates, Bureau of Markets, and the Office of Farm Management, thus bringing together in one bureau the various forces which are working on these economic problems. I think we have made some real progress in this matter and I am hoping that within the year we shall be in better shape than ever before to serve agriculture in this particular field. Dr. Ball, as you know, is entirely familiar with our work in this direction. Having acted as the head of the Economic Council, I should be glad if he might have an opportunity to tell about it, and also of some of the newer activities of the department.

Also, as you know, the agricultural appropriation act of last spring carried with it authority to appoint two new officers, one a Director of Scientific Work and the other a Director of Regulatory Work. Dr. Ball has been appointed to the former position. His task will be not only to coordinate and in general to supervise the scientific work of the department, but to bring this work into harmonious relations with scientific work carried on at the various experiment stations to the end that there may be least wasted effort. I am sure that there can be greater cooperation between the department and the stations to the benefit not only of these two agencies of service but to the agriculture of the country as well.

I have not yet appointed a Director of Regulatory Work.

In asking Mr. C. W. Pugsley to come here as Assistant Secretary of Agriculture, I had in mind not only his general fitness for this position, but his special fitness for the supervision of our extension and publication

work, both of which have been placed under him. I understand that he will have an opportunity to speak to the delegates at New Orleans on these matters and will draw upon them heavily for counsel on certain plans which he has been making with a view to enabling the department to render greater service in these fields.

Again expressing my great disappointment and regret that I can not be with you this coming week and trusting that this may be an unusually helpful meeting, I am,

Sincerely yours,

(Signed) HENRY C. WALLACE,

*Secretary.*

The United States Commissioner of Education, John J. Tigert, delivered the following address:

**THE RELATION OF THE FEDERAL BUREAU OF EDUCATION TO THE STATE  
UNIVERSITIES AND COLLEGES**

BY JOHN J. TIGERT

My short occupancy of the office of Commissioner of Education has been quite ample to satisfy me that the relation of the Bureau of Education to other educational institutions, movements and organizations is understood by very few. The functions and the scope of the Bureau of Education's activities are exceedingly vague in many minds and few educators, not to speak of others, appreciate the limitations under which the bureau is compelled to do its work. Before going to the bureau, I was already aware that there was considerable criticism with reference to the manner in which statistical matters were handled by the bureau.

It occurred to me, when invited to read a paper before a joint session of the National Association of State Universities and the Association of Land-Grant Colleges, that a statement setting forth from the bureau's standpoint its relation to State universities and colleges, outlining the things that the bureau has attempted to do and expects to undertake with reference to these institutions, at the same time setting forth some of the difficulties under which the bureau labors and similar matters would be the most valuable contribution that I might hope to make at this time to this body. After I have finished, if I can have a frank and full discussion of the whole matter, I feel sure that I can return to my task greatly enlightened in regard to the problem of enlarging and improving the service of the bureau to the State institutions and may be enabled to remove some of the obstacles that now exist.

There are a large number of the staff of the Bureau of Education who may be brought, at least indirectly in contact with the State institutions of higher learning, but those persons who are brought most intimately in contact with them, I think, are: The Specialist in Higher Education, Dr. George F. Zook; the Specialist in Home Economics, Mrs. Henrietta W. Calvin; the Specialist in Land-Grant College Statistics, Mr. L. E. Blauch; the Specialist in Rural and Technical Education, Dr. Walton C. John; the Specialist in Industrial Education, Dr. William T. Bawden. Formerly, the bureau had a Specialist in Agricultural Education, a position last filled by Dr. Chester D. Jarvis, whose work naturally was closely related to the land-grant colleges.



#### SPECIALIST IN HIGHER EDUCATION

The Specialist in Higher Education is the head of the Division of Higher Education in the bureau and, therefore, is responsible for the direction and coordination of the activities of those persons on the bureau's staff who are working in the field of higher education. The Specialist in Higher Education is called upon to render a variety of services and holds himself ready at all times to meet the many calls that come for constant assistance to the universities and colleges of the country. For some time past, his efforts have been largely directed to surveys. The bureau is called upon to make a large number of surveys of institutions of higher learning and has considered this to be one of the ways in which it could best serve the State institutions.

The bureau has made surveys of about one-fourth of the land-grant colleges of the United States and its island possessions. Where the land-grant college was not connected with the State university, the university has been surveyed at the same time. The institutions surveyed include those in Hawaii, North Dakota, South Dakota, Washington, Nevada, Arizona, Alabama, Arkansas, Iowa, Tennessee, and Massachusetts.

Our Specialist in Higher Education has endeavored wherever possible to render assistance in administrative problems confronted by the State universities and colleges. Inspection of all the institutions of higher learning have been made in three State—Oregon, North Carolina, and Arkansas. He has been in the field a great deal, perhaps more than any other member of the bureau staff with the exception of the commissioner. During the past fiscal year, he addressed a large number of meetings, conferences, and associations, nearly a dozen of which were annual meetings and national in their scope.

#### SPECIALIST IN HOME ECONOMICS

The Specialist in Home Economics divides her time between the field and the office. In the field, she participates frequently in surveys, investigates the teaching of home economics in universities, colleges and normal schools, and in public school systems, participates in conferences and other educational gatherings at State and other institutions, and renders such general service as her limited time will permit. In the office she prepares reports on surveys, gathers materials for publication, looks after her correspondence, prepares questionnaires, arranges programs for home economics meetings, and holds the usual conferences with those who come to the bureau for information and assistance in regard to problems relating to home economics.

#### SPECIALIST IN LAND-GRANT COLLEGE STATISTICS

Every one in this assemblage knows, I take it, that the Bureau of Education is charged with certain duties in the administration of the income resulting from the principal obtained by the sale of lands granted under the first Morrill Act, an amount approximating \$1,009,335, and of the Morrill-Nelson fund, which amounts to \$2,500,000 annually, \$50,000 going to each State. The bureau is required to see that the interest from the former fund is at least 5 percent and that it is expended in accordance

with the requirements of the act. It is further required to audit the expenditure of the \$50,000 granted annually to each State for the college of agriculture and mechanic arts.

It is the special function of the Specialist in Land-Grant College Statistics to discharge these duties. Last year the Specialist in Land-Grant College Statistics visited each of the land-grant institutions for the education of Negroes. As a result of this tour of inspection a conference on Negro education was called at Atlanta, Ga., which was largely attended by representatives from Negro institutions.

#### **SPECIALIST IN RURAL AND TECHNICAL EDUCATION**

At the present time, the Specialist in Rural and Technical Education is giving his attention very largely to engineering education. Because of his short tenure of office, little has been done in this field as yet. As the result of a National Conference on Highway Engineering called by the Commissioner of Education at Washington last year, there was appointed a Highway and Highway Transport Education Committee. The Commissioner of Education is the chairman of this committee and the Specialist in Rural and Technical Education is its secretary. The latter is giving much of his time to the work of the committee which is undertaking to make a study of the economics of highway construction together with other related subjects.

#### **SPECIALIST IN INDUSTRIAL EDUCATION**

The bureau's Specialist in Industrial Education has little to do that relates him directly with the State universities and colleges. He conducts an annual conference on the training of teachers for industrial education and manual training. The universities and colleges which have departments of industrial and vocational education send representatives to this conference. This year the conference will meet at Ann Arbor, Michigan, December 8, 9 and 10.

Formerly, the bureau's Specialist in Industrial Education promoted research stations in connection with the departments of education in colleges and universities. At one time, there were twelve of these stations, but the bureau was compelled to abandon this work for the lack of money and the proper personnel to direct the work.

#### **SUMMARY OF THE WORK OF THE BUREAU SPECIALISTS**

From this brief summary of the work of the specialist, whose work is related to the State universities and colleges, it may be seen that the bureau has been attempting, as far as it possibly could, with very limited means and personnel, to promote the most important purposes of those institutions in the field of agriculture, engineering, and home economics and at the same time has offered such assistance as it could in the direction of administration and organization.

#### **PUBLICATIONS**

There are certain publications of the bureau which pertain particularly to the work of State institutions of higher learning. There are two annual

reports of this kind, "Statistics of Land-Grant Colleges" and "Statistics of State Universities and Colleges." There are in addition other publications which bear upon the work of higher education, such as: "The American Agricultural College," by C. D. Jarvis; "The Land-Grant Act of 1862 and Land-Grant Colleges," by B. F. Andrews; "Education for Highway Engineering and Highway Transport," by F. L. Bishop and W. C. John; "Opportunities for the Study of Engineering at American Higher Institutions," by S. P. Capen; "Report of Progress of the Subcommittee on College Instruction in Agriculture"; "Opportunities for the Study of Medicine," by G. F. Zook; "Opportunities for Graduate Study" (in press), by G. F. Zook; and other circulars and books of a similar kind.

It might be well to mention also that the bureau has prepared a considerable amount of mimeographed material relating to salaries, enrollments, and appropriations for State institutions of higher learning and normal schools. This material has been used by some in the prosecution of campaign for increased funds particularly before State legislatures.

#### THE BUREAU'S PLANS FOR FUTURE ASSISTANCE TO STATE INSTITUTIONS OF HIGHER LEARNING

Let us turn now to the presentation of the plans which the bureau has under contemplation for assisting State universities and colleges:

(a) Proposed change in the statistical blanks sent to State universities and colleges in collecting information for the annual report.

It has been the practice of the bureau to send to the land-grant colleges the blank arranged for gathering information for the report on "Statistics of Land-Grant Colleges" and also the blank which is sent to all universities, colleges, and professional schools.

As these blanks overlap considerably in the information required, it results that the land-grant colleges are asked to duplicate, in a degree, the material they furnish the bureau. The filling out of numerous questionnaires, blanks, and other forms of inquiry has become a great tax upon the time and patience of some who are otherwise overburdened and the bureau appreciates the fact that our blanks should be as brief as possible to secure the necessary information and that duplication on separate blanks entails a waste of time. We are aware that there has been some complaint about the necessity of duplicating information. In order to remedy this difficulty, our Specialist in Land-Grant College Statistics is now engaged in working out a combined blank which can be used for all State institutions and which will make it unnecessary for the agricultural and mechanical colleges to make out two different blanks. Mr. Blanch has made some progress on the outline of this blank and Dr. Zook proposes to submit it to the officers of State universities and colleges for consideration and suggestions, before its adoption. We feel that this attempt will be appreciated by the land-grant colleges and we crave your cooperation in bringing about this expected improvement in our statistical service.

(b) Information for assistance in securing funds in the State legislatures.

As previously stated, the bureau is undertaking to gather and disseminate information which will be helpful in securing increased appropriations. We believe that this work can be continued and enlarged with increasing value to the institutions served. The bureau sends out a questionnaire to all State institutions to gather the figures on current registration, the present appropriation, the proposed budget to be submitted to the State legislatures, and similar items. This material is collected as quickly as possible, mimeographed and distributed to all State institutions for use in connection with presenting their needs in the various State legislatures. The bureau has already received much commendation for undertaking this work and hopes to make this service more valuable in the future. We think that the land-grant colleges and other State institutions of higher learning will find useful the latest possible figures in registration and financial support in institutions of similar character. The questionnaire for this material for the current year was sent out quite recently and we hope that the returns will come in promptly so that we can compile this material for distribution at the earliest possible date.

(c) Surveys.

The bureau is convinced that the surveys that it has been making have been productive of great benefit. Frequently, when the bureau is called upon to do work of this kind, subsequent requests come from the same quarter to undertake something more. As an example, the bureau was called upon recently to make a preliminary investigation of the colleges in the State of Arkansas. After this was done, an invitation came to direct a survey of the State university and, upon the completion of that work, an invitation came to conduct a survey of education in the State which work is just now being inaugurated. This and similar experiences convince us that our survey work is exceedingly helpful.

In addition to the surveys that have been made in individual institutions already referred to, the Bureau of Education was requested by the Committee on College Organization and Policy of this association to make a comparative survey of a number of land-grant colleges. At that time, it was contemplated that Dr. Jarvis could do a great deal of the field work in connection with this proposed comparative survey. Dr. Jarvis' resignation and other considerations have prevented progress on this comparative survey. However, the Specialist in Higher Education has done some preliminary work at one or two institutions as a basis for the proposed comparative survey and will submit to the Committee on College Organization and Policy, during this meeting, an outline of what it seems desirable to attempt in connection with the comparative study.

(d) Additional services under consideration.

In addition to the services of the bureau described, the Specialist in Rural and Technical Education has undertaken two studies for the benefit of land-grant colleges upon which some progress has already been made. The first of these is a review of land-grant education during the last decade, 1910-1920. He has already entered into tentative arrangements with several leaders in land-grant education to contribute portions of this review. The other study is a continuing investigation of engineering education which has been proposed by some of the officers of the Society for the Promotion of Engineering Education.

## LIMITATIONS OF THE BUREAU OF EDUCATION

We have undertaken (1) to offer a brief summary of the persons on the bureau staff with an outline of their duties, who have attempted to further the aims and purposes of State institutions; (2) to summarize what has been done and what is proposed in the immediate future. We now wish to turn to a presentation of some of the difficulties to which the bureau is subjected in undertaking to accomplish its work.

Before going to the bureau, I had heard certain individuals whose duties in their respective institutions brought them into relation with the bureau—registrars, business agents, executives and others—express a degree of mystification with reference to dealings with the bureau. I had seen some manifest wonder, for example, why the bureau sent out the same blanks several times and after having received them duly filled out, was unable to furnish this same information to those seeking it. I have heard the question asked, for example, "Why does the bureau wait until its statistics are so old as to be practically useless before publishing them?" and so on with numerous other questions which seem to reflect a high degree of inefficiency in the work of the bureau.

May I say also that, since going to the bureau, I have seen evidences of similar mystification on the part of the bureau staff with regard to some of those with whom they must deal in the field. The question is asked, for example, "Why it is necessary to send the same blank questionnaire to a given institution six, seven and even eight times before a reply is received?"

It seems to me that a frank statement and full confession of our limitations may go far to clarify the situation and, with a mutual understanding of our difficulties, we may expect to remove some obstacles and promote a higher degree of patience when we find it impossible for the time to remove the limitations which hamper us.

I desire to state for those who may not have the opportunity to know them, the general limitations under which the bureau operates. The personnel of the bureau, with the exception of the Commissioner of Education and the Specialist in Higher Education, are all under the civil service regulations with the consequent delays and difficulties in making desirable additions to the staff and in relieving inefficient and needless employees. The remuneration of each employee is either fixed in the statute under which the position was created and, therefore, can not be changed except by Act of Congress or, as is the case with most of the bureau's technical staff, remuneration is afforded from a lump sum appropriation made by Congress with maximum limitations on the salaries which may be paid from such appropriations. So far as I know, Congress has never changed any of the statutes fixing such salaries. If so, it has been rare and accomplished with exceeding difficulty. Many of these positions were once compensated to a degree comparable to positions requiring similar ability outside the bureau. However, salaries on the outside have increased slowly but steadily, especially during and immediately following the war, but the salaries in the bureau have remained fixed. Consequently, the difficulty of maintaining the efficiency of the bureau is being all the time greatly magnified. There is not now a capable person in the bureau whose compensation is commensurate with what they might receive in an outside

educational position. University and college executives are constantly being put to their utmost resources to retain capable faculty members in the face of alluring offers in the commercial world. The bureau is confronted with competition not only in the commercial world but in educational institutions whose salaries, low though they be, are proportionately better than the bureau can offer for similar services.

Aside from the commissioner's salary, the highest statutory salary in the bureau is \$3,000 and the highest salary payable from a lump sum appropriation is \$3,500.

But how does all this affect our relation to universities and colleges? Only in that it makes it well-nigh impossible to transact business with them and other institutions with which the bureau must deal on as efficient basis as a bureau of the great Government of the United States should be operated. Nowhere do we feel this limitation more keenly than in our relationship to institutions of higher learning.

I think that I may pardon myself if I explain our situation more definitely, even though I must enter into personalities. The Specialist in Higher Education is a statutory position with a totally inadequate compensation. Immediately the bureau is able to train a man to render effective service in the position he is likely to become the recipient of offers in executive and administrative positions that pay far more than this meagre salary now fixed by the statute. In the position, one necessarily comes in contact with those looking for desirable men in the administrative field. The history of this position bears out my contention. Dr. Kendrick Babcock rendered great service as a Specialist in Higher Education but the University of Illinois took him as a dean for her College of Arts and Sciences. The bureau was very fortunate to secure another capable man for this position in Dr. S. P. Capen. At the height of his service, he was called as Director of the Council on Education at two and one-half times the salary he received in the bureau. Dr. Zook, who is just getting into position to render large and effective service to the institutions of higher learning will likely be grabbed up by some greedy institution of learning and the bureau can not hope to fill his place. The bureau is, therefore, constantly in the embarrassing position of bringing in new men only to have them taken away as soon as they begin to render effective service.

This is true more particularly with reference to the Specialist in Land-Grant College Statistics, I think, than any other place in the entire bureau. As has been already stated the Federal bureau administers and audits annually a fund of over three and one-half million dollars for the land-grant colleges, but Congress fixes by statute the salary of the person who undertakes to discharge the duties of the bureau with reference to this fund at \$1,800. This position was created originally as a Clerk Class 4, Agricultural College Clerk, in 1895. It has been held by nine different persons in 26 years. During that time, the position has been vacant for a total period of one year and five months. When I came into the bureau on the second day of last June, it had been vacant since February 11 last. It was more than two months before we were able to get the position acceptably filled. We are peculiarly fortunate in securing the present incumbent, Mr. L. E. Blanch, but how long we can retain him is another question.

It is readily conceded that the statistics of the bureau would be far more valuable if they could be published without so much delay. For

example, the "Statistics of Land-Grant Colleges" for the year 1918-19 are just ready to be printed. One must realize, however, that the printing fund, the statistical equipment and machinery, the personnel in the statistical division in the bureau are all totally inadequate. These have increased but little through a number of years in which the work to be done has enormously increased. All the while the number of colleges, high schools, elementary schools, and other institutions are increasing in number and the attendance is multiplying at a tremendous rate, but meantime the bureau's facilities for gathering and disseminating educational information have remained almost stationary. Imagine, for example, the increased labor in recent years in gathering and disseminating information with reference to secondary schools.

Sometimes, all printing is stopped in the bureau for lack of funds, sometimes the regular work of the statistical staff has been hampered by extra activities when the staff is too small with its present lack of equipment to keep its regular work current. The Commissioner of Education has been compelled to keep reducing the scope of the statistical work with the hope that the staff might bring its reports down to date. In 1915-16 the general statistics were put on a biennial basis instead of an annual basis as had been the case previously. And yet the 1918 biennial report is the last in print and the 1920 report is not yet ready. Unless more ample means are provided as the volume of material increases the bureau will be compelled to resort to longer cycles in its statistical reports or else lag far behind. It seems that it would be folly to skip any interval in the regular collection of educational statistics which would thus leave a hiatus in the records for all time.

We are just now undertaking to alter the plan of our statistical work and reduce the amount of work to be done so that there shall be reasonable hope that our staff may carry the load. Some statistics may have to be collected in cycles of five or ten years in order to accomplish this result.

Realizing the difficulties under which the bureau operates, you who have to deal with it may see why the work has been somewhat erratic at times and must fall far short of the ideal which we all cherish. We hope that as a result you may be led to deal with us gently, patiently, and at any rate without serious interruption in your religious growth and life.

If there are any criticisms, either of a destructive or a constructive nature, which members of this body are ready to offer us at this time, we are eager to hear them. Our most earnest and sincere desire is to render the largest possible service that the bureau can render to education in the United States with the funds and personnel at our disposal. We must work, however, with what we have and not what we need.

Let me say, finally, that the Bureau of Education is deeply appreciative of the splendid cooperation and enthusiastic support that it has enjoyed in the past from the institutions of higher learning, particularly the State universities and land-grant colleges. We are asking that you continue to display that patience with our shortcomings which has characterized you in the past and we hope that mutual good-will may not only be continued but increased in the future.

Following is the report of the treasurer:

## REPORT OF THE TREASURER

October 19, 1920 to November 8, 1921

## RECEIPTS

To balance on hand Springfield meeting .....	\$ 424.33
To 47 dues at \$75 .....	3,525.00
To 2 dues at \$55 .....	110.00
To 2 dues at \$35 .....	70.00
To 4 dues at \$20 .....	80.00
To 12 Liberty Loan coupons .....	242.30
To certificate of deposit No. 1380, Howard National Bank, \$526.67, plus \$11.84 interest .....	538.51
To certificate of deposit No. 1379, Howard National Bank, for \$2,011.50, plus \$51.95 interest, less certificate of deposit No. 1445, Howard National Bank for \$1,500 .....	563.45
To 7 U. S. Post Office Department checks for \$1.35 each—refund thirty-third proceedings lost in mails .....	9.45
	<hr/>
	\$5,563.04
Disbursements as per statement .....	5,524.24
	<hr/>
Cash on hand November 8, 1921 .....	\$ 38.80

## DISBURSEMENTS

Executive committee .....	\$1,578.20
Special committee on Smith-Lever and Smith-Hughes relationships .....	260.91
Extension committee .....	46.25
Committee on instruction in agriculture, home economics, and mechanic arts .....	36.35
Special committee on engineering .....	24.00
Committee on Smith-Towner Bill .....	5.75
Secretary-treasurer office .....	186.19
Honorariums, Dean Charters, Dr. Taylor .....	117.00
American Council on Education—dues .....	100.00
Proceedings and bulletins (printing, stenographic service, editing, postage, expressage, programs, etc.) .....	1,669.59
Certificate of deposit .....	1,500.00
	<hr/>
	\$5,524.24

## ASSETS

Cash on hand November 8, 1921 .....	\$ 38.80
Certificate of deposit (July 15, 1921) .....	1,500.00
Interest at 5 percent .....	23.63
Liberty Bonds (third issue) par value .....	2,000.00
(Coupon No. 7 due September 15) .....	42.50
	<hr/>
	\$3,604.93



## REPORT OF THE AUDITING COMMITTEE

The auditing committee has examined the accounts of the treasurer and finds the same to be correct. All vouchers properly approved and receipted have been found on file. It also finds a bank balance as stated of \$38.80 and finds in the treasurer's hands an affidavit of the comptroller of the University of Vermont, dated November 3, 1931, to the effect that he holds in behalf of the treasurer, in a safety deposit vault rented by the university, two converted Liberty Bonds, third issue, Numbers 785070 and 785071, for one thousand dollars (\$1,000) each, with coupons 7 to 31 inclusive attached to each, and a certificate of deposit, Number 1445, of the Howard National Bank for \$1,500, dated July 15, 1931, bearing simple interest at the rate of 5 percent per annum.

BRADFORD KNAPP,  
ANSON MARSTON,  
*Auditing Committee.*

WEDNESDAY EVENING, NOVEMBER 9, 1931

The vice-president, President Howard Edwards of Rhode Island State College, called the convention to order at 8 P. M. and introduced the president of the association, Dean H. L. Russell of the College of Agriculture, University of Wisconsin, who delivered the following address:

## PRESIDENTIAL ADDRESS

## THE AGRICULTURAL EXPERIMENT STATION IN MIDDLE LIFE AND AFTER

BY H. L. RUSSELL

What is the dead line in human experience? Doctor Osler some years ago acquired unenviable publicity by calling attention to the relative sterility of individual effort when the age of two score was reached. Some of us are old and decrepit at forty, if productive accomplishment is to be the gauge by which we are measured; others not. Some gain their stride only after years of training. Like the witch-hazel, they blossom in the fall of the year when "deep in the hollow of the wood, the autumn leaves lie dead"; so, too, with institutions.

The American experiment station as an institutional idea is less than fifty years old. On a Federal foundation it has just closed the first third of a century of its existence. Its beginnings were based first on the action of the several States, ranging from 1875 to 1886, when twelve States had organized experimental work in agriculture on a definite basis. Then came the Federal movement which has placed in every State a research center of activity that has been maintained continuously since that time.

The present is a pertinent time to ask ourselves the question whether as an institution the future has in store for us a field of constantly expanding influence, or whether we have served our time, and as we pass the threshold of middle life, we are going to be content to sit by the fireside and dream of the accomplishments of the past. Those of us who are close to the problem know too well that the balance between the various phases of agricultural endeavor has been most radically altered within the period of the war.

#### THE PIONEER AGRICULTURAL COLLEGE FAILED TO FULFILL EXPECTATIONS

The agricultural college of the third quarter of the last century was by no means a thorough success. The earnest desire of the American farmer to found a school which was imbued with a somewhat different ideal than the endowed college of a classical type, which might serve as a training ground for the applied lines of agriculture and mechanic arts, received Federal attention and aid in the passage of the Land-Grant Act of 1862 during the throes of civil strife. But these schools fell far short of meeting the aspirations and ideals of the farmers themselves, and were the subject of scorn, if not contempt, on the part of the academician who saw nothing good outside of the halls of culture in which the more orthodox courses of learning were presented. As Chancellor Avery told you last year, there was little that was distinctively worth teaching in the land-grant college of that period, until the vivifying influence of the research work of the experiment stations and the Federal department of agriculture breathed the breath of life into the dry bones of the instructional methods then in vogue. Teachers without adequate scientific foundation or experience could hardly be expected to inspire the youth under them.

The organization of the American experiment station based on the Hatch Act of 1887, came as a necessary corollary to the teaching college of the earlier decades. Here through experimental inquiry, new knowledge was discovered, new principles uncovered which would guide to better practice.

What this system has now brought about the entire educational world knows. The American system of education in the applied lines as given in the land-grant colleges has long been the object of admiration and emulation in many other countries. The influence of the American experiment stations has, I believe, been more marked than similar institutions in Europe in the main, because they have been more definitely articulated with the people whom they were designed to serve, through the fact that they were organized for the most part in direct connection with the agricultural colleges of their respective States.

The rounding out of this system of agricultural endeavor reached its final fruition in the passage of the Smith-Lever Act for the extension to the masses of the knowledge so gained. This triple grouping gives solidity and stability to this educational system. A three-legged stool is a firmer foundation than a two-legged support.

#### NECESSITY OF MAINTAINING PROPER BALANCE WITHIN AGRICULTURAL COLLEGES

To maintain a proper balance between these three lines of educational activity—teaching, research, and extension—is to keep these forces of the state in proper relation for continued growth. These various activities should be kept abreast of each other and not tandem. All of them are equally important in that each contributes to strengthen the other.

Having evolved a system of education that is recognized throughout the world as superior in its organization, we should be derelict in our obligation if we did not maintain a proper adjustment in the relations of one part to the other. But will this balance be maintained without conscious effort on the part of those most intimately in touch with the situation? Educational development, or lack of it, comes from pressure, both within

and without. Institutions are forced to respond to pressure, and every administrator knows full well that he is often unable to mold the institution under his direction according to a previously conceived plan. The varying educational needs that arise from time to time often press with such force that they may completely alter the course of development of an institution. Wise administration senses a real need early, and consciously plans to meet it, but the educational administrator often is unable to do what he would do as far as he can, or what he can as far as he wills.

Will it not be worth while for us to look earnestly at the situation in which the American experiment station finds itself at the present time?

#### EDUCATIONAL BALANCE CHANGING IN LATE YEARS

The rapid expansion of our colleges in number of students within the past decade has completely changed the balance between teaching and research. In the engineering field of the land-grant college, teaching has always dominated research, but even a decade ago, the enormous influx of students into the agricultural courses in most institutions had only begun prominently to manifest itself. The inability of most institutions to adjust their staffs quickly to meet this rapid influx led to increasing assignments of teaching being imposed on staff members who heretofore had had more time for research. A 10 or 20 percent increase in student body at the opening of the fall semester had to be taken care of. To do this many a piece of valuable research has had to be laid aside, owing to the unexpected demands made by this influx of students for which no adequate provision had been made. So frequently has this situation developed in the past decade that it may almost be said in some institutions to have become habitual. And habits are bad. One may make a mistake once and it may be excused or overlooked, but when the same mistake is repeated, it becomes a habit, and habits are often only an excuse to cloak a crime.

To prove the accuracy of this generalization, I have only to quote the actual figures, as recently stated by Dr. Allen, in an editorial in *Experiment Station Record* (May, 1921), in which he says that "in 1911 less than 43 percent of those on station staffs had teaching or other duties in connection with college work, while at the present time the proportion is fully 60 percent."

We are yet too close to the Great War to know whether this situation is going to exert as strong an influence in the next decade as it has in the last. In most of our older agricultural institutions, it appears that we have passed for the time being the peak of rapid expansion in numbers of students. The industrial depression that has hit agriculture with such peculiar force this last year will certainly not induce as many youth to look forward to this field as was the case some five or six years ago when the lure of the land and the back-to-the-farm movement were filling our colleges with boys from the city who could not tell whether a halter went over the head or tail end of a horse, or did not know what was the function of the udder of a cow.

## EXPANSION OF EXTENSION ACTIVITIES

Another pressure that has developed in our colleges with unwonted intensity during the past decade is the unparalleled expansion of extension activities. This work has been the logical fruition of the developing agricultural educational system. If agricultural education is worth anything, it ought to be utilized in the main by those who live on the soil. An expansion in the function of an educational institution, to meet the needs, not only of the student body that comes to its doors, but the great farming public who has a right to look to the college for the application of its research to actual practice, was in process of rapid development, even before the passage of the Smith-Lever Act. But the war accentuated the acceptance of this service. The drives for food production which were possible through the organization of the emergency food agents, and the relative success attained through this instrumentality, have led to a public support and approval of extension work that is little short of marvelous. In 28 States the increase in extension funds by direct state appropriation had been approximately a million and a half dollars. This in large measure has been due to the provision in the Federal statute requiring the State to meet with additional funds the increasing appropriations made by the Federal Congress.

Extension work is popular because it performs a service that is appreciated. Its support is readily forthcoming because the taxpayers who pay the cost see that they themselves are getting some direct benefit from their money.

But with reference to research, there is no such outside pressure for the rapid and aggressive prosecution of the work of the experiment station. Here and there some farmer raises a question that bothers him and for which no solution has yet been found. He may put the problem to his experiment station and urge them to undertake its solution, but this is generally a still small voice of individual request compared with the general demand which comes from the resident student or the farming community. Who is there that has in mind constantly the necessity of keeping up the supply of research to vivify and vitalize the character of the teaching and the extension work as well!

Our farmers are by no means standing still in their agricultural processes. Constant advancement in extension work must be made to insure the highest degree of success. Unless research is constantly opening up new facts, new explanations, and new principles, extension teaching will soon sink to a sterile repetition of old material and die of dry rot. Experimental inquiry is the living spring that vitalizes all other phases of agricultural instruction. If the fountain fails, all other activities languish.

The war is undoubtedly responsible in large measure for this changing emphasis. Now that the war is over and we are face to face with the thankless task of paying the costs, curtailment in expenditures is the order of the day. It is easy to deny adequate support to such activities as these because the popular clamor does not rise in an overwhelming wave demanding expansion in investigational activities.

## LET US NOT FORGET THE LESSONS OF THE WAR

Already we are in danger of forgetting one of the most obvious lessons learned in the war. If any one fact came out of the world conflict in clear relief, it was that the contributions of science exerted the profoundest effect on the outcome of the struggle. The chemist, the physicist, the engineer, the man who knew how to harness the forces of nature, chemical, mechanical, and electrical, was fully as potent a factor in the outcome of results as the man who carried the rifle. Food production and sanitation were as powerful as bullets. In no clash of battle that has ever occurred have the efforts of scientific endeavor counted for more than in these recent days. Europe is profiting by these lessons in the endowment which some of the warring countries are now making to bring themselves abreast with the scientific knowledge of the day. Tax-ridden England has granted to its agricultural institutions an increase of over a million pounds income. It realizes more than ever before that a nation which raises only enough food to feed itself over the week-end is in need of balancing production and consumption more perfectly. Are we here in America girding ourselves anew, and buckling down to a keener realization that in the competitive world struggle for commercial supremacy, we must maintain our scientific research if we are to continue to go forward?

## CONTINUITY IN SERVICE ESSENTIAL TO CONTINUED ADVANCE

The fundamental defect in our experiment station organization is the lack of continuity of service. Successful effort in science, whether applied or pure, cannot be obtained by organization on a factory basis, where new workmen can readily replace experienced operators. Scientific effort can not be standardized like the manufacture of automobiles. Even an assistant in the research laboratory must be able to do something more than hit hour after hour the fourth bolt on the left door as the conveyor carries the body of the machine past him. The enormous overturn in our stations has practically changed the personnel as markedly as a political upheaval upsets the population of official Washington that is outside of the purview of the Civil Service Commission.

Doctor Allen presented at the Springfield meeting a year ago some startling figures. In six years from 1914 to 1919 no less than 80 percent of our station personnel was changed. Out of 1,700 persons occupying positions of a technical character, 1,400 left for other openings. Further, there was an actual decline of about 250 persons in the combined station staffs. Another significant fact was that 370 of these changes were heads of departments and leaders of special lines of work.

Naturally the war itself was the largest disturbing factor. Many of our staffs if not in the draft were volunteers in the civilian services, either at home or abroad, but the post-war record of 1920 is almost as bad as that of the war. The turn over for 1920 shows but little abatement from the annual average for the '14 to '19 period.

Lack of adequate financial support in the matter of salary increments and the unusual competition of a commercial character which prevailed during the boom days of '19 and '20 made it increasingly difficult to hold promising young men in the field of research. The seed which was sown that year will show in the scientific results of the next decade. It was

almost useless to talk to the graduate of a year or two ago and try to enlist him to enter the field of experimental endeavor. When commercial concerns stood ready to offer the graduate just out of college two to four times what the salary roll of any college could then warrant, and when living expenses were at the peak, it is scarcely to be expected that the promising young graduate would be willing to take up an academic career where the prospects were no better than those which prevailed at that time. With the commercial depression now on, conditions are again changing, and it may be expected that we are about to enter an era in which more nearly normal relations are apt to obtain. In any event, for the sake of research in the future, it is incumbent upon administrative authorities to see that the most likely of our youth are given an opportunity to develop in this field.

#### EXPERIMENTAL WORK NEEDS MORE ADEQUATE SUPPORT

This can not be done, however, without adequate resources for the experiment stations. The inadequacy of financial backing of these institutions as a whole is evident when one realizes how few of the States have supplemented the Federal Hatch and Adams funds in any material way. From the standpoint of funds the total resources of the stations have not been increased during the last six years, and in the meantime, operation costs have been substantially doubled. For the year 1920 funds in a half dozen States were actually decreased over pre-war figures. Doctor Allen has just informed me that a similar situation has been reported for 1921.

In the group of States in which there was any increase, although relatively large (28 in number), the increment was merely nominal, in hardly any case equalling the actual advance in operative costs.

From the standpoint of Federal support, no change has been made since the passage of the Adams Act in 1906, or fifteen years ago.

With the working power of the dollar at present reduced from a pre-war basis fully a third, if not more, and in comparison with the situation which obtained in 1906 even a still greater reduction, it is obvious that the experiment station is going backward rather than forward in its facilities, while on all sides greater and greater demands are being made on it for additional service.

#### THE PURNELL BILL

The situation is now before the public in tangible form in the proposed Purnell Bill that has been introduced in Congress. The scope of this bill widens materially the field of agricultural inquiry. It is an effort to keep pace with the advancement of the times. Since the days of the Hatch and Adams Acts, entirely new fields of agricultural inquiry have sprung up. Rightly does the Purnell bill call specific attention to the prosecution of studies that bear upon the "economic and sociological problems that have as their object the development and improvement of the rural home and rural life."

#### NEW FIELDS OF EXPERIMENTAL ENDEAVOR

The whole field of economics as applied to agriculture has been developed within the past ten years. The problems of distribution need just as

scientific study as the problems of production. It is of little use to increase crop output if a glut in the market decreases the value of the product, making it less and less profitable. The farmer can not afford to ignore the marketing of his output, any more than the consumer can afford to let the middleman inject into the distributive channels needless expense in multiplying the distributive units. The subject of cooperation needs most careful study. Ill-advised plans are continually being propounded, too often by self-seeking enthusiasts who have had little or no actual experience. Farmers have lost large sums by adopting these half-baked ideas, in their laudable effort to find some way to lessen the economic waste that now obtains. If the State were justified in establishing an institution to make the experiments along lines of production which would save the individual farmer from the heavy penalty of paying for the mistakes which he must inevitably have made whenever he attempted to try a new method, is it not equally advisable to provide the necessary means to collect the available information with reference to marketing processes which will prevent needless loss and waste?

And why should the experimental method be confined exclusively to agricultural problems? After all, the advancement of mankind is the aim and purpose of all educational effort. The desirability of extending the field of research to cover the problems of engineering and home economics is at once patent. The problems of the home touch all mankind, not merely those on the farm. Are not questions of human dietetics equally as important to solve properly as those of animal nutrition? If so, how are they to be solved properly except through the application of the experimental method?

The granting of Federal aid in the dissemination and extension of home economics information under the terms of the Smith-Lever Act implies that such aid is as applicable to research in the field of home economics as it is to agriculture under the provisions of the Hatch and Adams Acts. If the Morrill Acts providing for the establishment of the land-grant college institutions were concerned with the support of mechanic arts as well as agriculture, why should not provision also be made for the prosecution of research in both of these fields? Sooner or later Congress will recognize these obligations as just and meritorious. Already a number of the individual States have as usual taken the initiative and organized engineering experiment stations.

#### MORE FUNDAMENTAL RESEARCH NOW REQUIRED

In the field of production, a more fundamental type of experimentation is now required than obtained a decade or so ago. The questions that lay near the surface and were easily asked have been easily answered. As the miner's shaft sinks deeper and deeper into the earth, more and more preparation has to be made to handle the problem of ore removal in a systematic and economical manner. As the depth increases the water has to be pumped out, the lodes timbered and shored up, and many things done that contribute essentially but only indirectly to ore removal. So, too, with our more fundamental inquiries. Disease can not be cured until the cause is first ascertained, and even then, the relation of host to parasite may involve physiological studies that lead far afield from the immediate object of treatment. The deeper we go into the problems of feeding,

the more fundamental must our nutrition researches become. If we start on a practical problem of a pig-feeding experiment, we may before we get through find ourselves deep in the study of vitamins on such test animals as white rats and guinea pigs. The advances that have been made in recent years in our knowledge of nutrition have required just as fundamental study as Roentgen gave to the X-ray or Madame Curie to radium.

A president of a leading university told me some years ago that he thought such fundamental work ought to be undertaken only in the pure science laboratories; that an applied institution such as an agricultural college ought not to attempt to handle such work. If such a concept had obtained, the agricultural college of today would not contain the men that it does—men who find added zest to their scientific endeavors because the problem has a practical bearing that if solved will put the vocation of farming on a higher intellectual plane, and will disenthral it from the realm of hazard by placing it under the operation of controlled and co-ordinated processes. No! the agricultural college that permits itself to be thus restricted in its development is ready for the educational junk heap. But it costs money to sink these shafts constantly to deeper and deeper levels. Yes! that is true. But any other course will inevitably deaden the spirit of a school. Such an experiment station no longer deserves the name "experiment." It had better avowedly become an inspection bureau.

#### REGULATORY ACTIVITIES TEND TO SMOTHER RESEARCH

This leads me to say further that a fundamental defect is that too much of our experiment station activity goes into the performance of control and regulatory activities. The mass of routine duties that naturally devolve upon service institutions that must see that the laws are enforced develops an atmosphere that, if not antagonistic to, at least hampers and often smothers research. Legislatures are continually making laws, providing regulations to control activities of all kinds, telling you what you cannot do, and providing a penalty that must be imposed if you do anything. To regulate and inspect these operations some kind of an organization is required. What better place than the experiment station to analyze the feed samples collected, to inspect the fertilizers used, to test the seeds sold, to see that noxious weeds are eradicated, to control the multitude of plant and animal pests that continually ravage our flocks and fields. Then, too, Congress naturally loads up the Federal Department of Agriculture with meat inspection service with its thousands of veterinary examiners, other inspectors to dig out the barberry to check the ravages of wheat stem rust, another set to vaccinate for hog cholera, still another to inject tuberculin, until finally experts get so thick that one wonders whether any function of the body politic has been overlooked. Valuable and desirable and praiseworthy as these services have proven to be, the question after all is, have they added to or detracted from the efficiency of the experiment stations and the Federal Department of Agriculture. These functions come under the police powers of the State. They are legitimately within the scope of a regularly constituted arm of the State service, but such activities hamper and hinder the investigational and instructional work of an educational institution.



Pardon a personal experience: Some years ago I had an experience in court with a feed dealer who had repeatedly disregarded the law by selling adulterated and misbranded feeds. The law placed on the director of the experiment station the obligation to inspect feeds offered for sale and the initiation of the legal enforcement of the act, if its provisions were violated. The opposing counsel took the ground that unless I, as director, personally appeared to testify, the evidence could not be admitted in court. The judge so ruled. The next time we caught the same fellow in the same act, I traveled 300 miles to appear personally against him. We thought this time we had all of the holes stopped up, but the judge on the contention of counsel, in the matter of a telephone communication between the inspector and dealer, ruled that the evidence was not positive that direct communication was actually had between these individuals, and again the court ruled against us. Did the expenditure of time necessary to punish this culprit add to or subtract from the efficiency of the director of the experiment station?

To unite experimental endeavors with such duties as these, important as they are, is like trying to ride two horses at once going in opposite directions. Sundry experiences quickly led us to take the initiative in asking the State legislature to assign all regulatory, police, and control activities of an agricultural nature to the State department of agriculture. Some of our staff thought this was a mistake, because it reduced the operations of the station, but I am frank to say the work is now more effectively done than it was possible for us to do it, and I also know that relief from such regulatory functions has enabled our related departments to focus their attention more specifically on our educational problems. Similar segregation has now been developed in a number of the States and the announced policy of this association as well as of the National Association of Agricultural Commissioners has been to divorce these regulatory functions from educational and research work.

This idea is also gaining ground in the administration of the work of the Federal Department of Agriculture. The growth of the regulatory services in that department has been most marked in recent years. The pure food act, the drugs act, the meat inspection service, the quarantine act against plant and animal importations, the grain standards act, the cotton futures act, and the recently enacted packer and stockyards control show the tendency of the times in national affairs. An atmosphere of this type inevitably develops an organization that certainly does not stimulate research. The recent appointment of specific officers to administer the scientific research and the regulatory services of the Federal Department is a move in the right direction and one which will be highly approved by this association.

The lure of the commercial field during the past two years has led our students to neglect research. Add to this the financial status of too many of our stations, and the outlook to secure the brightest and best to go into agricultural science is poor. The result is that the younger element in the station staffs has become sadly depleted. Unless these faculties are constantly recruited with fresh blood they soon grow stagnant.

But few of our research men can keep their time untrammelled for scientific work. As soon as they begin to make a name in research, cross-currents begin to develop. Other institutions constantly in need of new

men offer opportunity for change. Generally such offers present larger responsibilities and necessarily higher pay. But the result in pulling up stakes and making a new home always checks fruitfulness. You cannot transplant a bearing tree and expect it immediately to take root and maintain its fruitfulness. Neither can you transplant a scientist without interfering with the productiveness of his research. I do not mean by this that it is unwise to make a change in location, for broader opportunities may mean in the long run increased productivity, but such disturbance can not but affect prejudicially continuity in work.

#### TRANSFER OF PROBLEMS

Often a change in institution does not permit of a transfer of the problem under consideration. Agricultural research in the State experiment stations must perforce be largely concerned with problems that are pressing for solution in the State which supports the institution. Problems that would be germane to New England can rarely be transferred to the Pacific Coast or even to the Middle West. The result is that frequently the scientific worker in changing location finds himself perforce in a position where the loss of momentum in his scientific efforts must inevitably follow.

Growing recognition in research often results in distractions due to public attention. The continued productivity of more than one of our best scientific investigators has been curtailed by growing popularity and increasing call for their participation in general meetings that have consumed so much of personal time that otherwise would have gone into research. True it is that a forceful expositor is advancing scientific knowledge among the masses by his lectures, but too frequently at the expense of his scientific career.

This loss may, however, be partially offset by drawing bright young minds about him through whom wider results may be secured. Such investigators become great teachers; they stimulate research in others, but too frequently only at the expense of their own researches. They multiply their own hands through those of their disciples.

This is the fundamental reason why a close connection between research and advanced teaching is of positive advantage to both. The highest type of graduate work can not be separated from research. It draws its inspiration and life blood from research. It can no more thrive without it than the branch can grow apart from the parent trunk.

It is pertinent to ask whether the best research can thrive without the contact and stimulus which comes from a reverse relationship. There are a number of independent research establishments in various scientific fields, such as medicine and some of the pure sciences, that are salient examples of productivity of the highest class, but in the main the fertility of segregated research institutions is seriously hampered by the sense of isolation that obtains. The number of special foundations for research in agriculture is altogether too few to warrant a generalization, but it is a well-grounded conviction on the part of the speaker that the value of the State experiment station as a research institution has been greatly enhanced by the close contact which its workers have with university thought and practice.

## RESEARCH NEEDS PROPER PUBLICITY

A fundamental defect with reference to experiment station work is that the public at large fails to appreciate the significance of the results that are actually attained. Research has such an intangible sound, at once implying so deep and mysterious a realm, far beyond the ken of the practical man of affairs, that he feels that he has no part or interest in such abstruse speculations. The station worker himself is too often so engrossed in the details of his study that he too draws apart from the everyday world, and devotes his time and his talents to the problem at hand, with little or no thought of bringing his results to bear directly on the struggles of the masses about him.

It is here that the fully equipped station needs a well organized information department whose primary function it is to see that the products of the scientific worker are converted into the current coin of the realm so they will circulate more freely from hand to hand. Too much of our scientific results is carefully deposited in cold storage in the form of elaborate memoirs, in uninteresting and voluminous bulletins couched in technical language whose "highbrow" proclivities bar it from the ken of many a farmer who otherwise might apply it.

The staid old type of bulletin or annual report that comes to the desk year after year dressed in the same typographical make-up, full of tables, and with no illustrations, thinks it is an *Atlantic Monthly* on the inside, because, like the law of the Medes and Persians, it changeth not in form or substance. Such conservatism is left hopelessly behind in this moving world. An experiment station that does not "sell" its wares to the public through properly prepared publications and suitable publicity relative thereto, falls far short of its obligation as well as its opportunity. The fact that so much of station endeavor is done out of the lime light, that the work has not the natural contacts with the public as has either extension or teaching, makes it all the more necessary that station administrators should not lose sight of those proper means that are at hand for showing the public the results accomplished and their significance.

To sum up: In what ought to be the zenith of our strength, are we as research men girding ourselves for the coming decades in such a way that research in our land-grant college institutions will continue to furnish inspiration and verve to our teaching work, whether it be in the classroom to our student body, or in the field and forum to our farmer friends? Agriculture today needs as much as ever, the stimulus of such effort and on those of us who bear the responsibility for the direction of such endeavor must rest the obligation as to whether we maintain for the future the splendid standards which have been handed to us from those who have gone before.

The president introduced Dr. Alonzo E. Taylor of the Food Research Institute of Stanford University, who presented the following paper:

## THE WORLD'S NEED OF RUSSIA

BY ALONZO ENGLEBERT TAYLOR

The occurrence of famine in Russia coincident in other countries with unemployment of machinery and workmen that before the war were engaged in production for Russian trade, has drawn the attention of the world to the problem of Russia. The problem of Russia is not merely an internal situation involving a catastrophic experiment in communism; it is a problem in international trade. It is my purpose to undertake an appraisal of the utility of Russian commerce to the nations with which she traded and to determine, from the standpoint of exchange and of the commodities themselves, to what extent a functioning Russia is indispensable to her neighbors and to oversea countries.

Before the war many of the countries of Europe drew wheat, rye, barley, oats, corn, and oil seeds from Russia. Europe is not suffering from the need of these cereals; the fall in Russian production has not resulted in scarcity of grains. And yet it would be folly to conclude that the deficit in Russia has not resulted in profound injury to Europe because a lack of Russian grain has occasioned scarcity of grain in the world.

Russia is indispensable to Europe, not because her grains and oil seeds are irreplaceable in terms of calories, but for reasons grounded in the economics of international exchange. It is easy to exaggerate the physical importance of commodities. Economic processes are not visible in the same way, it is difficult in any moment to secure a panoramic view of world trade in which the actual utilities of commodities are perspectively revealed. We exaggerate the physical importance of the commodities that used to be obtained from Russia and underestimate, or neglect, the exchange processes of which the commodities were the material aspects. The elementary truth of the situation is that the disappearance of the exportable surplus of Russian agricultural products is serious in its consequences upon Europe and the rest of the world, not so much because of the utility of the products themselves, as because of the lapse of purchasing power.

The problem of Russia is of importance to us outside of the direct question of trade. The current popular conception of our foreign trade is that our exports should be double our imports; to compel foreigners to sell to us their investments in this country; to draw to this country the gold supply of the world; and then to keep up the excess of exports over imports on credits or foreign loans floated in this country. This trend of trade can not continue indefinitely. Foreign nations can not continue indefinitely to send us gold. American bankers and traders, or the Government, can not continue indefinitely to extend credits. Foreign governments can not indefinitely float bonds on our market. Expenditures of tourists can not equalize the trade. The unfunded balance is nearly three billion dollars. Eventually, the excess of exports over imports will fall away, unless American capital is prepared to make extensive annual investments abroad for productive purposes. Our situation and that of Russia being diametrically different, study of Russia can not fail to enlighten us by indirect illumination.

Let the facts be first established. Consider continental Europe, including the United Kingdom, as separate from Russia and engaged in trade with Russia on the one hand and oversea countries on the other. It

is difficult to make exact comparisons between prewar and the present conditions, because of the secession from Russia of Finland, the East Baltic States, Congress Poland, and Bessarabia. But the comparison may be carried through without substantial error. While Europe, thus defined here and elsewhere in this presentation, contained before the war certain states that were food exporters, just as some of our States are food exporters, most of the countries of Europe were highly industrialized and were food importers, just as many of our States are food importers. Of the prewar European countries Austria-Hungary, Bulgaria, Roumania and Serbia produced more food than was consumed within their boundaries, and exported more than they imported. The other nations of Europe produced less than their requirements, and imported more than they exported.

Considered as a unit, Europe was a huge importer of foods, feeds, and raw materials. These imports came from Russia or from overseas, disregarding Algeria and the other adjacent Mediterranean areas. The importation of Europe from these two sources, Russia and overseas, were delicately balanced. The datum line of price was Liverpool, the final place of cancellation of the bills of exchange was London.

Europe did not pay for imports of commodities with exports of commodities. The imports exceeded the exports. The excess of imports over exports was rising before the war, the standard of living was being expanded more rapidly than production. The annual difference between imports and exports of goods was paid for with returns on foreign investments, services rendered in shipping, insurance and in other directions, remittances of emigrants, and expenditures of tourists. Year in and out, relatively small shipments of gold sufficed to balance the trade. In so far as the balance of imports over exports of goods was paid for by returns on foreign investments, this meant that the standard of living of Europe was in excess of current earnings and was being maintained out of the savings of previous generations. Within Europe remained few extractive areas. The prewar Roumania, Serbia, and Bulgaria were still in the extractive stage of development, annually requiring increments of foreign capital for the expansion of production, in the same manner though not to the same extent, as Russia.

The datum line of price was Liverpool, London the market of exchange. Many factors of income and outgo cooperated to produce the position of equilibrium that characterized the trade of each year. What each nation imported was the expression partly of the goods it had to export in payment, partly of physical need, partly of the intensity of the psychological factors of valuation, and partly of the requirements of plant and tool expansion to correspond to increase in population. What Russia and the overseas exporting countries had to offer Europe was less the expression of their productive capacities than of the consumptive capacity of Europe. The consumptive capacity of Europe, the buying power of European commodities and invisible resources were the determining factors in production in Russia and in the overseas countries, in so far as related to trade with Europe and not with each other and with the other portions of the world. The trade with Europe was, however, the largest fraction in international trade.

I have said that the productions of the countries supplying goods to Europe was not an expression or measurement of their productive capacities, but was a response to the consumptive capacity of Europe. The limitation lay with the buyer. These countries could have produced far more goods before the war, had a larger European market been available. When any one country supplying Europe with goods underwent an eclipse for any reason, it lay within the power of the other productive countries promptly to replace the deficit.

War and communism have erased for the time being the productivity of Russia. The consequences of the war have reduced the consumptive capacity of Europe, not in the utility sense but in exchange terms. The commodity needs are in every direction as great as before the war and in many directions larger, but the consumptive capacity in trade-terms, in ability to contract, is much reduced. Thus we have a position out of equilibrium in two ways—out of equilibrium because the balance between two productive areas (Russia and the oversea countries) supplying Europe with goods, has been destroyed; and because the equilibrium between consumptive capacity of Europe and production outside of Europe has been profoundly altered.

The failure of Russian exports means reduction of buying power in two directions. The fraction of exports that covered imports represented Russian consumptive power. The fraction of exports that covered payment of foreign capital represented consumptive power in the various lending countries. Russian exports failing, Russia consumes less and her creditor countries consume less. If a country drops out, her exports (production) are quickly seized upon by other countries. But the imports of the country (consumption) are not taken over in the same manner.

The following table presents figures for the average imports and exports of Europe, as defined, for a series of years before the war. I have used each country's valuation for imports and exports. No claim of exactness can be made for these figures. It is impossible in the trade statistics of the different Governments of Europe clearly to separate transit trade from importation for use. Without question, however, the table presents an illustrative picture of the total requirements of Europe and of the respective contributions received from Russia and overseas, in rounded figures, in values of goods.

#### EUROPEAN IMPORTS AND EXPORTS

##### European trade with Russia:

Imports from Russia .....	\$667,000,000
Exports to Russia .....	421,000,000

##### European overseas trade:

Imports into Europe .....	\$4,070,000,000
Exports from Europe .....	2,298,000,000

##### Trade between European states:

Imports .....	\$6,312,000,000
Exports .....	6,140,000,000

What Europe is now trying to do is to transfer the items of trade with Russia to the commerce with oversea countries.

The productions of a large country like Russia are very diversified. Most of her activities Russia shared with other portions of the world; in

a few directions she possessed what amounted to monopolies. An appraisal of the indispensability of Russian products must obviously include a segregation of the two classes of goods. We have first to concern ourselves with the commodities grown freely elsewhere in the world as well as in Russia, and secondly with certain commodities in whose output Russia occupied a predominating position. And in connection with these last commodities we must endeavor to determine to what extent Europe and the world have been able to escape from their previous dependence upon Russia.

The position of Russia in world trade before the war may be briefly sketched. The foreign trade of Russia was nearly 4 percent of total international trade in terms of value. Russia ranked sixth in the order of exporters, ninth in the order of importers, and seventh in the order of monetary value of total foreign trade. Russian imports from European countries averaged in the five years before the war about \$421,000,000, according to Russian valuation. Her exports during the same period averaged about \$667,000,000, according to Russian valuation. The imports into Russia were valued by the dispatching countries at about \$301,000,000 and the exports from Russia were valued by the countries of destination at about \$988,000,000. If we accept the Russian figures for valuation of imports and exports, the excess of exports over imports would be \$246,000,000. If we accept the foreign valuations for imports and exports, the excess of exports would amount to about \$687,000,000. Authorities are in agreement that the fairest method of contrasting imports and exports in terms of value is to use for imports the values of the importing countries; and for exports to use the values of the different importing countries of the world to which they are dispatched. On this basis the average annual excess of Russian exports over imports in the five years prior to the war was about \$567,000,000. The causes of these marked discrepancies lie in unreliability of appraisals, in different methods of valuation in different countries, in accidental and intentional under- and over-valuation, and in the fact that customs house figures are often not identical with the figures on the bills of exchange. The actual truth lies somewhere near the middle probably, though there is no way of checking it up. It is probably safe to say that Russia sold to Europe annually about \$500,000,000 worth of goods more than she purchased from Europe. It must not be inferred that the goods purchased by Russia from the countries of Europe necessarily originated in Europe, or that commodities shipped from Russia to the different countries of Europe were there consumed. A large amount of transit trade is included, and a considerable portion of goods denominated imports from and exports to European countries came from or were destined for overseas.

According to Russian records the country before the war annually imported directly from overseas countries (including China and Japan) goods to the value of about \$99,000,000, of which nearly half came from the United States. During the same period the annual direct exportation to overseas countries amounted only to \$24,000,000. The valuation of these imports by the countries of export was \$70,000,000; and the valuation of the exports by the countries of destination was \$36,000,000. In direct trade Russia imported from overseas countries more than she exported to overseas countries. If we subtract the figures for the value of Russian

exports in the countries of destination from the Russian valuation for her imports, the figure representing the negative balance of oversea trade would be approximately \$63,000,000. As thus stated, Russian commerce with oversea countries is underestimated and her commerce with European countries overestimated, since transactions with oversea countries are included in the figures for commerce with Europe. These data do not include about 6 percent of Russian foreign trade—the transactions with Turkey, Egypt, Persia, Afghanistan, Korea, Algeria, Morocco, Ceylon, Gibraltar, Malta, and the Central American States.

Subtracting the figure for negative balance of commodity trade with the oversea world from the figure for positive balance of commodity trade with Europe, we obtain the figure of \$504,000,000, which represents in approximate terms the value of the annual excess of commodities exported over commodities imported. This figure looks high, but no method of correction is available.

Russia had few invisible resources. Russian emigrants seldom sent back remittances. Tourists spent little money in the country. To other countries she rendered few services of the nature of shipping and insurance. Russians had few investments abroad. For practical purposes, therefore her invisible resources may be disregarded and we may say that Russian commodity exports represented her total exports. On the other hand, Russia was the site of many foreign investments. She had been the recipient of many foreign loans, Governmental and private. The balance of exports over imports of commodities was employed to pay fixed charges on foreign capital (interest and amortization) loaned to or invested in Russia. Shipping and insurance absorbed some. Some of it was used abroad in developing foreign policies. Russian profligates wasted considerable sums in riotous living abroad. A large but indeterminate part of the favorable balance of trade was used to pay for armament, military equipment of all kinds, imports of which were not reported as goods in the customs house records. Military extravagance and bureaucratic waste were glaringly illustrated in Russia. In each of the years designated, Russia borrowed abroad more money for improvement of transportation, development of industries, for military purposes, and to pay interest charges.

The following table presents the figures for the average exports of certain important products from Russia during the five years before the war. So small a portion of these exports was to oversea countries that for practical purposes it may be said that Europe was the destination of the total exports of cereals and oil seeds from Russia:

Wheat .....	161,000,000 bushels.
Barley .....	167,000,000 "
Oats .....	63,000,000 "
Rye .....	29,000,000 "
Corn .....	26,000,000 "
Potatoes .....	7,000,000 "
Flaxseed and sunflower seed.....	600,000 tons.

The figures for flaxseed and sunflower seed are much less certain than those for cereals. Some of these seeds were shipped out uncrushed, others crushed; and to some extent cake and meal were returned to Russia. The



exportation of oil-seeds and oil-seed meal was an important fraction of of Russian trade. In value and calories the oil-seeds exceeded oats, rye, or maize, and indeed practically equalled the three, and was surpassed only by barley and wheat. The chief buyers of Russian agricultural commodities were Germany, the United Kingdom, the Netherlands, and France, in the order named. The table serves to illustrate the large contributions made by Russian agriculture to man and beast in Europe.

Russian grain and oil-seeds have been completely replaced in the markets of the world. I am well aware that the statements as to replacement of Russian grain by grains grown elsewhere in the world stands in contradiction to numerous gloomy forebodings by theoretical statisticians with respect to limitation of world agriculture. It is, however, established in fact and clear in theory that the world has by no means reached the operation of the marginal acre. There is a large reserve in world agriculture that is responsive to demand on the basis of price. A moderate stimulus in price is still potent to secure increased agricultural effort. A comparison of the total acreage under cultivation in the United States, Canada, Argentine, Australia, and India during the prewar period and during the war will illustrate the capacity for expansion that has become actual in response to demand.

The preliminary estimates of the wheat crops of the reporting countries for the present year (not including Russia) indicate that the total for the year will be practically 3,000,000,000 bushels. This is about 300,000,000 bushels larger than the crop of last year. There is also an improvement in rye. The world carry-over was at least normal. There was no shortage of wheat last year. The wheat went farther because extracted higher in milling. The improvement in the world wheat crop over last year exceeds the average export wheat of Russia before the war. India, ordinarily an exporter, will not export this year and may import a small amount. Russia will be an importer, if credits are extended and transportation adequate. But wheat seems available for all.

When one analyses the acreages and yields and contrasts them with those of the prewar period, it is clear that the wheat raising capacity of the world today, exclusive of Russia, on the plane of productivity of the prewar period would be well over 3,500,000,000 bushels. Waiving aside Russia and India, it is doubtful if the wheat importing countries of the world will require during the coming year over 550,000,000 bushels. If the mills of Europe maintain the present extractions, the importations may be materially lower than last year. In any event there is no scarcity of wheat in the world, though crop failure in 1923 may have that result.

One of the principal exports of Russia in terms of utility to the foreign world was flax, of which in good crop years before the war upwards of nearly one-quarter million tons were exported. Russian flax was for the largest part coarse and of a rather inferior commercial grade. Outside of Russia it was not used to a large extent in wearing apparel or in the home, linens of finer grade produced in other countries being preferred. It was, however, important for many technical uses. Russian raw flax was largely worked into goods in factories in the United Kingdom and these have been hard hit by lack of raw material. The lapse of the Russian crop of flax has not been made good to any material extent by replacement with flax from other sections of the world. In Argentine and Canada, flax

is cultivated for the seed, as is also the case in our country. These countries have not attempted to replace Russian flax. At the high price of linen, substitution has been actively undertaken. Long fiber cotton and ordinary cotton especially processed are able to replace linen in many uses. Efforts to imitate linen by processing of cotton have been so successful in Germany that technical tests are required to distinguish the two fibers. Deprived of Russian linen, the world has gradually adapted itself to the lack of the fiber. Certain grades of coarse flax have long since been replaced by hemp, jute, or manila. Finer grades have been replaced by mercerized cotton and coarse silk. It would be stretching the use of the word essential to denominate Russian flax as essential to the industries of the world today. Desirable it would be at a price, but not essential. What has been said of flax applies to the far less valuable hemp.

The Ural Mountains contain invaluable deposits of gold and platinum. The gold may be disregarded, since the output had fallen to a petty figure compared with the gold output of the world, though important to Russia as a basis for her circulating medium. Before the war Russia supplied some nine-tenths of the platinum of the world, the annual output being twelve to fifteen thousand pounds. During the last three years of the war platinum deposits were developed elsewhere in the world. The prewar platinum production of Russia would probably now constitute not over three-fourths of the potential world platinum production at comparable price. During the war the world was combed for platinum and at the close of hostilities a relatively large amount of platinum was in the hands of the different allied governments. The price has fallen rapidly and stands today at a relatively low figure, compared with the war price.

With respect to the uses of platinum in the arts, sciences, and industries it may be said that the art use of platinum is being expanded, particularly in jewelry, while the technical use is receding. By this I mean that year after year other metals and alloys are found capable of replacing platinum for particular uses. There are places where platinum is scarcely replaceable, as in the Wheatstone bridge. In most cases, however, it is a question of price. The best magneto-breaker points are platinum. Platinum is widely used as electrode and catalyser. Its use as a chemical reagent is very restricted. In some manufacturing processes it is irreplaceable, in others it is a question of price. The disappearance of Russian platinum has not made platinum expensive in the world, on account of the stocks accumulated during the war. The world's present consumption of platinum is, however, in excess of production, which means that at some time in the future the price of platinum will rise. At a certain price level, substitution would occur to such an extent as to check further advance. Important as platinum is, it is not critically essential to the world in the sense that if the Russian mines are not reopened this year or next, the world will face a catastrophe in the arts, sciences, or industries.

Of the total exports of Russia, cereals represented more than one-half in value. An unusually prominent position was occupied by butter, eggs, and poultry. The value of the exports of these products exceeded considerably that of petroleum. As a matter of fact, within recent years before the war the exports of petroleum were a comparatively negligible factor in Russian trade. Russia exported considerable timber, in a relative sense, though much of it came from Finland. Despite inflow of timber

from Norway, Sweden, and Finland, the United Kingdom feels the lack of Russian timber. Unquestionably, in the distant future the forest resources of Russia will prove of particular importance to Europe. A thorough-going reconstruction of transportation will, however, first have to be achieved. Russia contributed considerable sugar to northern countries, especially Scandinavia. But sugar is abundant in the world.

Five particular articles of export were furs, bristles, wool, caviar, and tobacco. The magnitude of these exportations was moderate and the world can easily dispense with the commodities themselves. Russia was once one of the important countries of the world as a source of manganese ore. During the war development of manganese elsewhere was greatly enlarged and the mines of Brazil and India are more than competent to furnish the manganese requirements of the steel industry of the world. It is questionable whether the manganese of Russia at the production costs of ten years ago could compete with Brazilian manganese in the market of today.

The chief Russian import was cotton, partly raw, partly manufactured. More than half the cotton came from the United States. The second item was hardware and metal goods—tools, wire, nails, corrugated iron, agricultural machinery and implements of all sorts.

Germany had the largest commerce with Russia. She supplied one-third of Russian imports and took one-fourth of Russian exports. The United States ranked third as exporter to Russia but imported very little from Russia.

When one surveys the importations of the several countries of Europe during the past three years, one observes that most commodities previously imported from Russia have been replaced by commodities from overseas. The volume of wheat and rye imported into Europe last year was practically the same as that imported during the prewar period. But the countries of origin are different. Consumption has been sub-normal. The scarcity, however, has fallen least upon human beings directly. By raising the extraction of the grain in milling from 72 percent to 82 percent it has been possible to maintain practically the normal average per capita flour consumption, except in certain of the countries of Central and Eastern Europe. A million bushels of wheat used to yield 225,000 barrels of white flour, now it yields 255,000 barrels. The deficit has fallen indirectly on the milk supply, since the higher extraction in milling has cut down the grain offals. What the consumer has gained in bread, he had partially lost in milk.

When, however, one comes to the importations of corn, barley, oats, and oil-seeds into Europe, one observes great reductions. Of these Russia contributed large amounts, particularly of barley and of oil-seeds especially linseed and sunflower seed. The barley was almost exclusively feed barley, and went largely to Germany. The protein in these feeding stuffs represented a large fraction of the concentrates employed in European feeding yards for the production of milk and for the finishing of hogs and cattle. The feeding stuffs have been replaced only in small part. This is not due to scarcity in the world nor to high prices. We have an abundance of cottonseed in the United States and supplies of coconut, peanuts, and other oil-seeds are available elsewhere to the point of excess. Europe naturally marshals her imports in a certain order; she ranks the importa-

tion of bread grains above that of feeding stuffs. Her exports and other methods of payments have not been large enough to cover substantial importation of feeding stuffs. Except to a few favored countries credits are wanting for this purpose. The situation is aggravated by the fact that outside of the United States the oil-seed markets of the world are practically under British control; and credits for the sale of large volumes of these commodities to the other nations of Europe, Great Britain can not undertake. Corn we have in plenty, and there is an abundance in Argentine; but the imports of Europe have been low.

The results of the lack of feeding stuffs upon the livestock of Europe are seen in the statistics of every country. Recovery in numbers is being delayed. Average carcass weights of slaughtered animals remain low, and the fat content is particularly depreciated. The unit milk production of dairy cows is much below the normal. These results are least pronounced in the United Kingdom. They are distinctly noticeable in France, are still more evident in Germany and appallingly ubiquitous in Poland and Austria. The only countries of Europe that obtain anything approaching a normal volume of feeding stuffs are Denmark, Holland, and Switzerland; and these countries have been unable to resume the normal plane of operation of their animal industries for lack of markets for their exportable surplus.

If Russia were producing these feeding stuffs, could they be purchased by the countries of Europe when oversea countries that have them in abundance can not market them in Europe? Yes, for the reason that the importing countries of Europe would be able to pay Russia with commodities. They are not able to pay the oversea countries with commodities. Russia was the natural market for the manufactures of central Europe. The people of Russia are in serious need of commodities that they previously obtained from central Europe, whose manufacturing plants possess the tools necessary to produce goods in accordance with customary Russian specifications. Germany could exchange goods for sunflower seed with Russia much more easily than she can exchange goods for cottonseed with the United States. Nor is it possible to effect these exchanges through substitution of triangular and quadrangular trades. It is today not possible for Germany to buy cottonseed from the United States, send textiles to Russia, and have Russia pay the United States for the cottonseed with flax. The trade of the world is so disrupted that the triangular and quadrangular transactions that were effected at a central point of exchange are now not working.

It is not to be expected that Russian agriculture will be quickly restored. Collapse in production has been due to division of the land, governmental requisition of crops, depreciation of currency, and breakdown of transport. The exportable surplus of grains and oil-seeds of Russia was an expression of her large area and of her state of social organization. It was not an expression of efficiency in operations. Russia was a country of large land holdings, operated according to a system that was almost feudal. Land-hunger appeared in Russia as a phenomenon of noteworthy political importance only within recent decades. Fifty years ago the cry of land-hunger was almost unheard in Russia. It received serious political consideration first in the nineties. During the war the agrarian question developed with extraordinary velocity and division of the land became the corner-stone of the revolution. The traditional methods of the large land

owners were effective but not elegant. The Russian peasant was fairly well fed and clothed but received little else beyond material provisions. His life was sordid, alcoholism raged rampant and uncontrolled, education for the masses did not exist, economic exploitation was widespread and profound, even following the abolition of serfdom in 1861. The causes lay in the political and sacerdotal organization of the country, of which the economic and social features were the associated expressions.

With the earliest introduction of peasant land holdings and with each increase in such holdings, it was observed that the returns per acre from the small individual holdings were greatly below those of the large estates. This was due in part to the fact that the large land owner had capital, credit, better machinery, competent and educated managers, and was thus able to place his agricultural operations above the plane of common inefficiency. In part, however, the returns on the large holdings were the expression of exploitation of tenant and field worker. Applied to the country as a whole, this state of affairs, the yields of large holdings, practically sufficed to explain the exportable surplus of grain.

Subdivision of the land has resulted in fall in production. For practical purposes one may say, based on prewar data of Russian production, that the outcome of subdivision of the land that has actually occurred might have been predicted. It is in general terms immaterial what the motive force of subdivision might have been. War-fatigue and the lethargy of communism have contributed to the inefficiency of the peasant. Agriculture has still further deteriorated with the general disorganization of trade, that affords the peasant no commodities desired by him in exchange for his products. But the bare fact remains that, had the land of Russia, without war or revolution, been subdivided as is the land of France, under the same conditions of private ownership, this would have been followed by heavy reduction in output as a direct expression of the inefficiency of the uneducated peasant, lack of initiative, low standard of living, and narrowness of horizon. Under the circumstances it is to be expected that the agricultural productivity of Russia will recover slowly. The ignorant peasant does not work hard, because his wants are few. It is not to be expected that he would work much harder if he had the commodities of the world at his disposal, because the standard of living to which he has been accustomed is low and in the nature of things not subject to rapid expansion.

Nevertheless it is only in the direction of restoration in agriculture that reconstruction in Russia is to be anticipated. The nations of western Europe seem united in the policy of limiting assistance to Russia to her agriculture, mines, and forests. Her manufactures are to be exterminated, she is to be made a producer of raw materials to be exchanged for the fabricated goods of central and western Europe.

If Australia, Canada, Argentine, and the United States have the wheat and rye required by Europe and can furnish it all, instead of joining with Russia in the supplying of the needs of Europe, as was the case before the war, why is it not more or less immaterial to Europe whether she obtains these bread grains from Russia or from the oversea countries? The answer here again is fundamental. Europe's power of paying Russia is one thing, her power of paying the oversea producing countries is a very different thing. These differences are both qualitative and quantitative.

In the qualitative sense Russia had certain requirements in commodities that could be supplied by Europeans, for the manufacture of which they were tooled up and to which their processes were adapted. The commodities that would be required in return by the United States, Canada, Australia, and Argentine are different and Europe is not in position to cater to the needs of these countries as she would be able to cater to the needs of Russia. In the quantitative sense the centralization of the trade of Europe becomes excessive. From these named countries Europe must already buy grain, cotton, copper, nickel, zinc, petroleum, and wool, to mention only the most important goods, and other innumerable things besides. To add to this a huge bill for more wheat and rye and for a certain minimum of feeding stuffs exceeds the capacity of the Continent to focus her commerce. If the oversea countries are to bear the total burden of supplying wheat and rye to Europe, they must develop a consumptive capacity for European commodities with which these may be paid. Such a consumptive capacity naturally exists in Russia, whose plane of consumption is low. But to add further increments to the consumptive capacities of the United States, Canada, Argentine, and Australia, where the standards of living are already high, is difficult and not to be achieved in a day. Unless these nations can take the goods with which Europe must pay in return for wheat and rye and dispose of them elsewhere in the world, there would be a surfeit of European commodities for them for the time being. The more the sources of supply for Europe are centralized, the more focused becomes the export trade of the European countries. What the world requires is diversification of trade, not centralization.

This matter can be elucidated specifically when the argument is applied to a group of farmers. Let us say that the farmers of Argentine by planting the marginal acre or by extra effort in expansion are able to increase their exportation of wheat 100,000,000 bushels. Can these farmers at once develop a consumptive capacity corresponding to the increment of wheat production? With great difficulty, obviously. But if the peasants of Russia, producing a nominal crop and living upon a plane of living subnormal for them, were to produce an export increment of 100,000,000 bushels of wheat, they could display immediately a corresponding consumptive capacity.

Do the farmers of Canada, Argentine, and Australia, when they replace the wheat of Russia, take from us, in addition to the cotton they normally imported, the amount of cotton that Russia would take, if she had the wheat to export? Certainly not. One-half of Russian exports before the war was cereals. One-sixth of her imports was cotton. But the nations that have replaced Russia in furnishing these cereals to the world have not increased their importations of cotton to the extent represented in the volume previously taken by Russia. When Russia exported 160,000,000 bushels of wheat, she expected to be paid in commodities. When Canada, Argentine, and Australia export an added 160,000,000 bushels of wheat, they expect to be paid in gold.

The proposition remains fundamental, whether applied to the individual or to the country. The consumptive capacity that corresponds to the wheat required by Europe annually will be more difficult to maintain in the United States, Canada, Argentine, and Australia, on top of the

customary standard of living, than in the reawakened Russia, whose plane of living has fallen far below the accustomed standard, low as that was.

Surveyed either from the comparative standpoint or by articles, it is clear that what the world misses today is not Russian production but Russian consumption. The Russian wheat is more valuable as money than as bread grain. Clearly, the importance of Russia to the world lies primarily in her consumptive capacity, and secondarily in her commodities that have lapsed. The world can replace the commodities themselves with relatively little difficulty. The world can replace the consumptive capacity only with great difficulty and in no short period of time. The effect of the raising of more grain in countries that are already heavy exporters does not extend widely outside the industrial life of those countries; but the withdrawal from the trade of the world of the consumptive capacity represented by 190,000,000 bushels of export wheat and rye in Russia, not to mention the feeding stuffs, extends through a net-work of ramifications that enter every civilized country.

Russia, that previously contributed 160,000,000 bushels of wheat to Europe, can not import a reciprocal volume of goods because she has no wheat in payment. The countries that have raised an added 160,000,000 bushels of wheat, find it hard to market it, because our consumptive capacity in imports has not been expanded in proportion. Because Russia has not \$400,000,000 worth of exportable grain and oil-seeds, she can not purchase goods to that value from producers the world over. Russia has been easily replaced as a producer, she is to a material extent irreplaceable as a consumer.

The Assistant Secretary of Agriculture, C. W. Pugsley, was introduced and spoke as follows:

#### DEPARTMENT EXTENSION PLANS

BY THE ASSISTANT SECRETARY OF AGRICULTURE, C. W. PUGSLEY

Last year's convention of the Association of Land-Grant Colleges recommended the consolidation of the Federal extension office of the North and West with that of the South. This was done by order of the Secretary of Agriculture, effective October 1. The details of reorganization have not yet been put into effect, and will not be until we are certain that they meet the needs of the cooperative extension work in a manner satisfactory to the cooperators.

Before leaving the extension work in Nebraska I was experiencing a growing feeling that our type of organization was lacking in some essential respect. The application of our organization plan to the work in the counties clearly indicated several things:

(1) The division of the work administratively along the lines of sex and age made a unified extension program very difficult. Try as we would to work out a program of agricultural progress for the State and for each county, we found our workers unconsciously regarding their problems from the standpoints of women's work, men's work, or junior work, rather than from the standpoint of the complete needs of a rural community.

(2) This led to administrative difficulties. The several agents often appeared separately before groups of farmers or before county commissioners presenting their claims for support. They could not be severely

censured for this attitude, for they were charged with responsibility for but one line of work. The difficulty rests with the system rather than with the agents.

(3) Many counties were financially unable to support a program calling for three agents. Others were unwilling.

(4) The inevitable result was the neglect of some important line of work. Either the men, the women, or the children must be left out of consideration.

My suspicion that something was wrong with our system of organization has been strengthened during the three and a half years since I left college work. I have had opportunity to observe it from without and to get the reaction of the farmers themselves in a way impossible to any person directly engaged in the work.

When I became associated with the Department of Agriculture I found that some of the Federal extension workers sensed the same difficulties. We determined to give the reorganization plan most careful thought, hoping that the new Federal organization would in no way interfere with the most logical and most effective extension program within the States.

Having been out of extension work so long I did not feel that I cared to subscribe to a reorganization program until I had secured the reaction of college people who have been thinking continuously and intensively along these lines. The department, therefore, sent out a letter stating that there would be no change in the administration of the work until a careful study of plans could be made. The letter making this announcement asked extension directors to send us suggested plans of reorganization which would permit the best development of the work in the States.

Replies came from more than half of the States of the Union, and from all sections. The unanimity of opinion on the points suggested above was rather surprising, and because of its unanimity gratifying, since it simplified the problem of reorganization. I wish to read quotations from a few of these replies to show the trend of thought among extension directors and college deans and presidents.

1. "There is a real difficulty which in the future may become exceedingly serious in the organization now existing in the States Relations Service and in many of the colleges, including our own. We are aware of a persistent tendency toward the building up of divisions which tend to become self-sufficient and independent, and which come to stand in relation to each other much as separate cooperative institutions stand."

2. "We have wondered whether it would be possible to so organize this work that it would all be looked upon as county extension work, not as county agricultural agent work, home demonstration work, and boys' and girls' club work."

3. "Certainly the home-demonstration activities, the farm-demonstration activities and the club work should be unified under one administration and not segregated to different administrative units. Nothing could be more disastrous than to provide different administrative heads for the several activities."

4. "The organization in the Washington office at present as relates to county agent work, home demonstration work, and boys' and girls' club work seems to offer a situation that will bear considerable thought. Perhaps this triangle with the equal angles can be worked successfully, but I



seriously question whether the best results can be obtained with this organization."

5. "There is a tendency for each man or woman to modify his or her work when it is on a separate foundation and thus to parallel the activities in a way so as to increase expense without increasing efficiency."

6. "Under our present system, an attempt is made to make a division between men's work, women's work, and boys' and girls' club work. As a result three distinct departments have been built up, each of which is more or less jealous of the others and when the workers come out into the States they carry their partisan ideas along with them."

7. "May I suggest that by all means the work be really and truly consolidated under one head and that there be no further divisions by putting a woman in charge of women's work, a man in charge of men's work, and somebody in charge of junior work."

8. "There is one feature of the present organization which has always troubled me, that is, the division of the extension work into various offices apparently wholly unrelated to each other, although the work itself can not be separated."

9. "There is a problem which we have in the States which I find also exists in the Washington office. I refer to the different types of extension work, country agent work, home demonstration, and boys' and girls' club work. We have not been entirely successful in our county and State work in getting all of these three lines of work in every county and in the State as a whole to function as a unit. There is a tendency to make the projects too distinct rather than to have all three lines of work nicking in properly in the solution of the farm, the farm home, and the community problem. I should like to see more emphasis put on extension work as such, both in the State and in the Washington office."

10. "If this three-way system were limited to the Washington office only it would not be objectionable to the States, but the import of that system is that the same division of work should obtain all the way down the line with the three leaders and their assistants in the State office and the three workers with closely prescribed duties out in the counties."

11. "It seems to us that the big need in the reorganization plan is to simplify the organization and so group different lines of work under the direction of leaders so that they will be coordinated and not have competing sections. In any scheme of reorganization probably it will not be advisable to disregard lines of work which have been already built up, but as rapidly as possible we believe that all extension people should view the field as a whole and develop their programs according to the needs regardless of how the work is done or with whom it is done."

12. "Any organization which recognizes the county-agent work as a project or boys' and girls' work and similar enterprises is continually cutting across the work of the extension specialist and complicating rather simplifying the whole extension plan."

13. "The definitely marked lines dividing extension work into three distinct divisions has seriously interfered with the development of a united extension program for the farm family."

The financial difficulties were expressed by a number of extension directors as follows:

1. "The big question is, can we expect within a reasonable time to put three agents into the greater part of our agricultural counties? Personally I feel that financial support can not be secured to supply all counties with three agents."

2. "The great problem that we have all got to meet, is one of funds."

3. "If we maintain a strong supervisory and scientific force I see no prospect of ever having funds enough to place these agents in all counties."

4. "We have but few counties that could ever hope to maintain three agents. The number that could support two, while many more than those able to support three, would not be more than one-fifth of the counties in the State."

5. "It is very doubtful if we will ever be able to carry a leader for three lines of work in more than a very few counties."

In a few of the replies some hint was given at the solution which was running through the minds of the directors. From the quotations which I have read, it is easy to infer that directors believe the organization at Washington should be changed to do away with administrative offices which divide the work along the lines of sex and age, and to make the paramount consideration that of a balanced agricultural program. Some of the replies openly declared the States' intention of changing their State organization as soon as possible. A few stressed the importance of having a county leader in full charge of the extension program. For instance, one says: "It has appeared to me that a head of county extension work in name and in fact, with assistants, particularly for the club work, makes for a stronger organization"; and another, "In our State we are trying to get all of the extension activities to clear through one county office. We want people to think of this office as the extension office of the county."

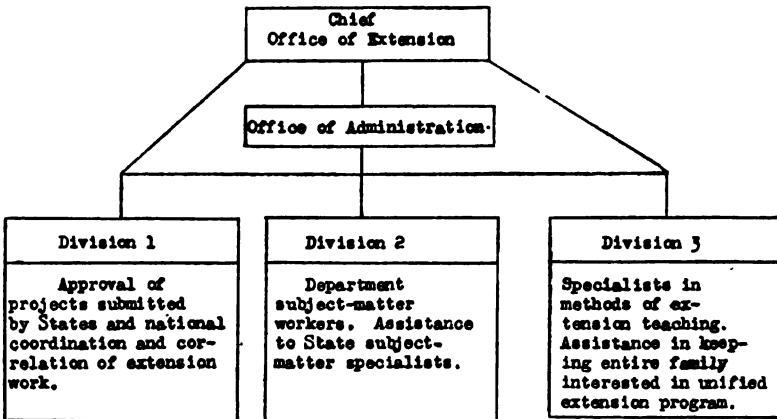
Personally I feel that there must be a county director in charge of all county extension work if we are to get far with a balanced program. The inevitable neglect of some phase of the work is the deplorable situation which confronts us if we do not make a complete extension program and insist that work shall be done on its most important phases. Some important lines of work are certain to be neglected under any plan which does not both make and execute a county program as a unit.

With our feelings strengthened by the letters which we have received, we outlined a few reorganization plans and sent them to members of the executive and extension committees of this association with a request that they give them very serious consideration. At our suggestion a joint meeting of the two committees was called here the day preceding your convention. All the plans were gone over and, after a day's discussion, an outline was unanimously agreed upon by your committees and the department representatives as the basis for building a new department organization.

This suggested plan does away with the Federal administrative units of county agent, home demonstration agent, and boys' and girls' club agent which have heretofore existed in the office of the North and West, and also changes the plan of the Southern office. It contemplates three main divisions. The first is one into which the projects, coming from extension directors, are fed and looked over from the standpoint of an extension program as a whole; the second is a division of subject-matter workers;

and the third is a division of specialists in methods of extension teaching. When we finally put the plan into effect, it will call for the reassignment of the workers of the North and South, but not a lessening of their efficiency or a radical change in their general duties.

A skeleton chart of the plan appears below:



Division I. The first, or project division, should be of great importance. It should be able to supply to the States, before they make out their projects, assembled and illuminated information on world conditions which will help in determining the stress which the extension workers should place upon various production problems. This will help to maintain a national agricultural balance. We have some evidence now during these times, that we might have avoided many heart-burnings if we had given more attention to supervision of this sort, and less to a hit-and-miss method of making out our projects without reference to the final and total emphasis paid to separate lines of work. A balanced program should give attention to the development of the social side of rural life, as well as to the development of economic production and marketing. A national agricultural program of progress can not be maintained unless all members of the farm family are interested in the consummation of such a program.

I sometimes wonder that we have made as much progress as we have up to date. Few of us have thought in terms of a balanced program. As an illustration I want to cite an apparently innocent inquiry which came from Dean Mann of New York to the extension office of the department. Briefly, he asked whether we had any rule for measuring the agricultural progress which had been made by extension work. This question stirred the extension office and was passed by it to the chief of one of the important bureaus. After consideration there it reached the office of the Secretary. One morning at the weekly conference of bureau chiefs, the Secretary startled them by asking for a definition of agricultural progress and a statement of how it should be measured. After three weeks of discussion the question has not yet been answered in the Department of Agriculture. We are making progress, however. We are thinking much more clearly on the matter than we did before.

It is natural that each agricultural worker should feel that agricultural progress should be measured in terms of his work. When he gets the broader vision he is very likely to modify his work to bring about a more speedy accomplishment of the agricultural problem as a whole.

I believe that every extension director, and I am not certain but every agricultural dean, would do well to have the same problem seriously considered by his workers. Such consideration pushes into the background the unimportant phases of work and magnifies those which must necessarily be considered in the accomplishment of the big task which is before us.

Division 2. In the second division we would place such subject-matter extension workers as are now in the Department of Agriculture, be they specialists in home economics or agricultural subjects. The Department of Agriculture is a tremendous research organization and has, or at least should have, worth-while information to extend. Congress has appropriated a large amount of money directly to the department for the extension of the results of this research. The plan contemplates that all department subject-matter workers will office in the various bureaus of the department and receive their inspiration and instructions for their subject-matter teachings from the scientists who are working on the problems. They, and the scientists themselves, will be available to extension directors upon call, but will not be sent to the States unless the extension directors want their services.

In this connection it should be remembered that we are doing a piece of cooperative extension work and that the department, as well as the experiment stations, may have something to extend. Our plan of extending department information is to permit department people, both research workers and extension specialists, to come in contact with extension workers, or, if the message and the men are of the type to permit direct contact, they may do the work directly with rural people, but always as a part of the force of the State extension department and under the direction of the extension director. It is not contemplated that the number of extension specialists in the department will be increased unless the extension directors ask for work of that kind. They certainly will not ask for it unless the specialists are rendering a worth-while service. I am thoroughly convinced that the place for the extensive development of extension specialists is in the colleges, rather than in the department. The department's extension work should be very largely in the direction of extending information to State extension workers.

I believe that the new unified extension program of work which so many of you have in mind will call for more extension specialists. They must be relied upon more and more to assist the county extension director to carry out the details of a balanced program. They will keep the entire extension movement on the foundation of fact. They will tend to keep county agents busy extending worth-while and fundamental knowledge. This will give them less time to serve as a mere messenger boy for farmers' organizations which should supply their own messenger boys.

Division 3. In the third division we would place those people who are best fitted to give help in interesting all of the members of the family in the unified extension program which has been agreed to in the project division. They are in effect organization and educational specialists in methods of extension teaching. They are people who have studied the

best ways of getting boys and girls interested in the facts of agriculture and home economics, or who have given special study of methods of interesting women or men in these facts. They will be available upon call of the extension directors to consult with extension workers on how to keep all members of the farm family at work on the projects.

We have not yet put the program into effect and will not until we have given careful consideration to the place which each extension worker should occupy. Neither have we determined upon the detailed operation of the new plan and we will doubtless exchange many letters with the States before the organization is completed. The plan has this great advantage. It is flexible and will adapt itself to the varying conditions and changing needs of extension work.

You are interested in knowing what the plan will demand in the way of changes in your organization. It demands no changes. You may continue just as you are now if you like. If you are convinced that you can better accomplish your extension work by a change in your State organization, we will welcome new organization projects. You may begin them at once if you desire. Necessarily these changes will be slow in the Nation as a whole; it is unwise to make them too rapidly, for both your workers and your people must be ready for a change before it is made. No doubt some States want to make a change at once. The plan which we have outlined will gear in to any sort of a State organization plan, so long as that plan is doing good work.

You are doubtless also interested in the department's attitude toward the administration of the Smith-Lever and other extension funds. The department is under obligation to follow those parts of the law which are specific, as well as to follow as nearly as possible the intention of Congress, as revealed by the records of the debates which resulted in the passage of the Act. Some of the specific terms of the law require the mutual cooperation of land-grant colleges and the department. We are very anxious that the cooperation shall be mutual. We are so thoroughly convinced that our relations are truly cooperative that we administer a million and a half dollars of money appropriated directly to the department for department extension work under the same rules, and in the same manner as Smith-Lever funds. We are very anxious that no Federal extension work shall be undertaken in the States except under our cooperative agreement. If you know of any such you will do us a favor by calling it to our attention.

The department is required to render detailed reports of its stewardship of these combined funds, now amounting to six and one-half million dollars. We must also account for the use of offset funds. We cannot render this accounting unless we have comprehensive reports. I wish it might be possible for every extension director to sit in the Secretary's office for a few days and answer the questions which come from Congressmen on the results of congressional appropriations for extension work. These come from both friend and foe. As Congressmen responsible for the appropriations and accountable to their constituents, they are not satisfied with other than detailed answers. If you could have that experience for a brief time I am certain you would regard the raising of comparatively unimportant questions in a very different light. You want us to impose as few obligations as possible in the performance of our

duties, but you also want us to prevent any unwise use of funds which might open the entire Smith-Lever appropriation to an effective attack by its enemies. Whenever public money is to be spent there are always those who insist on helping spend it, whether they are or are not rendering any service. There are two ways by which checks can be made on the use of funds. One is by detailed reports and the other by detailed inspection in the field. Obviously the simpler, more satisfying, and cheaper method is by means of comprehensive reports. We ask your help in making these as simple and effective as possible.

In closing let me repeat that the department recognizes only the extension director or other authorized agent of the land-grant college in carrying out its extension work. All our dealings and correspondence will be with him, unless otherwise instructed.

No specialist, either in subject-matter or extension methods, is to come to your State, except upon request of or agreement with the extension director.

Upon his arrival in the State he is to report first to the extension director and only to do the work agreed to by the extension director, and to do it under his direction and in cooperation with his forces.

No reports will be demanded by us except those which come through the extension director.

We will impose no uniform plan of organization upon any State, for we recognize fully that conditions vary and that a plan is only a means to an end.

In taking up the many questions that constantly arise, it is our policy to leave to the State directors, whom we regard as our representatives, all the small and petty details. We assume that the extension directors are as careful in seeing that the money is properly spent as we could possibly be. There are some things for which Federal money cannot be spent because it is specifically forbidden in the law, or because the Secretary does not consider expenditure for those purposes wise under the law. We will soon send each college an itemized list of expenditures which can not be allowed.

In short we consider it our responsibility to see that the funds, for the use of which we must render an account, are lawfully spent, and are accomplishing the purposes for which they were intended, rather than that we should dictate the details of the manner of their expenditure.

THURSDAY MORNING, NOVEMBER 10, 1921

The convention was called to order by the president at 9 A. M.

The Director of Scientific Work of the United States Department of Agriculture, E. D. Ball, discussed graduate work in the department as follows:

#### THE GRADUATE WORK IN THE DEPARTMENT OF AGRICULTURE

By E. D. BALL, Director of Scientific Work

One of the most serious problems confronting those charged with the administration of the work of the Department of Agriculture is that of the maintenance of an efficient personnel. That this problem has been becoming ever increasingly difficult during the past few years owing to the

increase in salary standards of other lines of government activity, as well as the increasing competition in the commercial and educational field, is well known to all of you.

It may not be as well known that the Department of Agriculture has more scientific workers under the civil service than all of the other bureaus of the government combined, the total number for the department being approximately 3,800 against 3,300 for other establishments. If this number is in each case strictly limited to those engaged in technical scientific work, the department on that basis has about 2,250 against 2,100 for all other government activities. These figures do not include anyone in the army, navy, or marine corps, or in the judicial branch of the government service. These scientific workers constitute to a large extent the motive power, the brains and creative ability of the vast agricultural machine, employing about 19,000 persons and expending about \$33,000,000 annually. Of this \$33,000,000, approximately \$18,000,000 is spent for regulatory work, a little over \$3,000,000 for service work, \$3,000,000 for extension work, and approximately \$9,000,000 for research. Making some further comparisons you will note that the government regulatory activities of \$18,000,000 almost exactly correspond with the total extension activities of the Federal Government, the States, and the counties, and that its service and research work together approximate \$12,000,000 or more than double like expenditure of all the experiment stations. It might be well in this connection to call attention to the fact that the total appropriation for research and scientific service work of the Federal and State governments combined is only equal to the total appropriation for extension, and if we segregate the sums expended for strictly technical research by all State and Federal agencies in the United States we will find that they aggregate only about \$12,000,000 or \$13,000,000 against the \$18,000,000 annually expended for the extension of the information thus gathered.

The Department of Agriculture therefore finds itself facing the problem of undertaking to maintain leadership in one of the most fundamental lines of effort essential to national development, in spite of the competition of other and more recently created government bureaus with higher salary standards, against the competition of the army and navy with much higher salary and more attractive service and retirement privileges, to say nothing of the competition of educational institutions and of the commercial world. That the joint reclassification commission appointed by Congress fully appreciated the situation is evident from its report in which it calls attention to the rate of turnover of personnel in Government service which averaged about 6 percent per year before the war period, jumped to 12 percent in 1916, and to 50 percent in 1919. They also recognized that the problem was doubly serious in the fact that the department was not only losing its trained and efficient workers but that the possibility of filling these positions with individuals who would ever develop to the attainments of those leaving was becoming increasingly difficult. This condition is summarized in the following statement:

"It is becoming more and more difficult to fill vacancies on account of the apparent apathy toward the Government service. This is especially true of young graduates of colleges and universities upon whom mainly the Government must depend to fill the ranks of the scientific-technical services. Letters received from presidents and professors of 40 of the best known universities and colleges reveal the fact that students display

little interest in the Government service and that the faculties show a disinclination to advise students to enter upon such a career under present conditions.

"The lack of a business-like policy of the Government as a basis for fair rates of pay has, as is obvious from the foregoing discussion, resulted in injustice to large numbers of employees, impairment of the morale of the working force, and a disastrous and costly "turnover," with a consequent lowering of the standards of efficiency."

The report discusses the attractiveness of the possibility of advancement through opportunity for research and advanced training, and states:

"The Commission believes that the Government could well afford to develop such opportunities to the fullest possible extent and encourage its employees in their use."

Discussing the counter-balancing restrictions in government service, such as restrictions on political activity, the report says:

"In the Department of Agriculture the written consent of the Secretary is necessary for doing any outside work. Such work in general is discouraged, and under certain conditions, forbidden. The general policy of the department is to refuse to grant leave without pay to enable employees to study at educational institutions. The publication of material pertaining to the work of the department is in all cases subject to the approval of the Assistant Secretary."

The above indicates that the policy of the Department of Agriculture has been exceptionally restrictive in these matters. In outlining what is considered to be the proper policy for the Government to pursue, the commission says:

"Finally, every effort should be made to stimulate initiative and originality on the part of scientific and other professional workers. It is peculiarly appropriate that the Federal Government should take the lead in research work of all kinds; but it can not do so unless it is able to attract and retain independent thinkers of the highest type. The reduction of red tape to the minimum, the encouragement of freedom of thought and action to the maximum, and the direction of research by thoroughly trained investigators would all assist to make this possible.

"Increased opportunities for training in the Government service along the lines recommended in the next chapter of this report, would also do much to increase the attractiveness of employment in Washington. This is particularly true of employees who are eager to supplement their education, but who find themselves handicapped under present conditions.

"Assuming, however, that departments have adopted the most effective methods of procedure possible, there remains the problem of securing and retaining a competent and industrious personnel to man those positions that are found to be necessary. What are the policies and what are the practical measures that will bring about the best solution of this 'problem of personnel,' as it has been termed? Not merely adequate salaries and attractive working conditions are needed. It is absolutely essential that there be consistent applications of a wise employment policy."

In discussing what the training would be the commission calls attention to the training work now carried on in different departments and especially commended the graduate courses offered by the Bureau of Standards for the past ten years, closing the discussion with the following paragraph:

"The commission believes that the training work of the Federal Government should be materially expanded, and that the reclassification which it is recommending will be of much assistance in making possible effective



developments of such training work. The definite educational standards prescribed throughout the various services should facilitate the working out in considerable detail of the general character and scope of the training needed to fit Government employees to render the most effective service."

This report does not deal with the army or navy personnel and therefore does not cite the fact that the Government gives a four-year college training to all officers for the army and navy free of all expense to the individual and pays them a certain basis salary besides. Further than this, in both army and navy work, if it is decided that additional training would make an individual more effective, he is sent at Government expense both as to salary and expense to further prepare himself for their work. This is done in the case of engineers needed for special services and for officers in the medical and sanitary lines as well as cases in the Coast and Geodetic Survey all of which are under the supervision of the War and Navy Department. It is, therefore, shown clearly that there are many precedents for the proper training of the research workers of the department if it is the desire of the department to do so.

The educational policy of the government with respect to its own workers has been outlined clearly and definitely in its army and navy policy and in the attitude of its reclassification commission. Its general attitude on the subject has been still further elaborated in the provisions of the deficiency act of March 3, 1901, as follows:

"That facilities for study and research in the Government Departments, the Library of Congress, the National Museum, the Zoological Park, the Bureau of Ethnology, the Fish Commission, the Botanic Gardens, and similar institutions hereafter established shall be afforded to scientific investigators and to duly qualified individuals, students, and graduates of institutions of learning in the several States and Territories, as well as in the District of Columbia, under such rules and restrictions as the heads of the departments and bureaus mentioned may prescribe."

The department, therefore, feels justified in adopting what it believes to be the fundamental intent of the Civil Service Commission in providing for the advancement of individuals from one grade to another, even to the highest positions in the Government service. As each advancing position calls for higher attainments than the one below, it is evident that if the merit system is to be in operation some provision must be made whereby individuals who enter the service in the lower classifications may receive adequate training to enable them to take advantage of the opportunities offered. The department has, therefore, abandoned the restrictions cited by the commission and in their place is now substituting administrative regulations, encouraging the workers to embrace every opportunity for advanced training; offering leaves of absence or part time assignments; providing, where it appears to be to the benefit of the department, for cooperative investigations in connection with graduate institutions; encouraging the establishment of graduate training within the department; and, finally, suggesting that it will welcome the graduate student of other institutions to its laboratories and opportunities and will undertake within the limits of departmental efficiency to supervise his work and certify his credits back to the institution from which he desires a degree.

In establishing this unofficial and self-supporting graduate instruction within the Department of Agriculture there has been no desire or ex-

pectation of setting up a competing agency to institutions now in existence but, rather, to establish cooperative relations with existing institutions whereby the trained scientists of the department will be able to give a certain amount of training and especially inspiration to a large number of the scientific workers of the department. It is confidently expected they will thus be encouraged to go on and affiliate with some standard graduate institution and complete the residence work necessary for obtaining higher degrees. The graduate instruction is at present under the supervision of a representative committee of scientists of national standing. It is the expectation that it will be possible to obtain about one-third of the teachers from nearby institutions and from the great scientists that are from time to time detailed to services in Washington. Instruction is now being given in agricultural economics, statistics, biological chemistry, plant physiology, heredity, mycology, physics of the air, and statistical mechanics as applied to chemical problems. Besides this we are sending students to a course in interpretation of data in the Bureau of Standards. These are formal organized courses of instruction. One hundred and eighty students, mainly from the Department of Agriculture, and a few from other departments, organizations, and institutions are already enrolled. The department is also arranging for supervision of advanced research in various lines and expects that this will eventually become a large factor in its educational program. A committee passes on the training and equipment of the individual to pursue lines of graduate work and will supervise the methods employed to ascertain his progress and determine the completion of a satisfactory course before certification for graduate standing will be given. Two of the organized courses of instruction at the present time are in the nature of review courses, for which no credit will ordinarily be given, the remainder are of graduate standing and will largely be used for minors. Two or three of the more advanced courses and especially the supervised research will, it is expected, be used as part of the major requirement.

The courses given this year will not ordinarily be repeated for three or more years. Agricultural economics will be followed by advanced courses in prices, land economics, markets, and others to complete an economic cycle. Genetics will be followed by an advanced course in plant breeding and this by a similar course in animal breeding. It is expected that similar cycles will be established in chemical, soil, and plant physiology-pathology lines with other courses added as gifted teachers are available.

The work is all given in the department buildings, outside of office hours. In general, each course will represent one-fourth of a year's work, or term's work, as the case may be. The department worker is only allowed to carry a single course without special permission.

Opportunity for educational advancement is recognized to be only one of many things necessary to bring about a greater permanence and efficiency in governmental service, but it appears at the present time to be one of the most fundamental. Increasing a man's salary does not increase his efficiency; it might easily result in increasing the permanence of the inefficient. On the other hand, the possibility of a higher salary, provided the efficiency was increased, might work wonders if along with it was furnished the possibility of obtaining the training necessary to increase the efficiency.

If the Department of Agriculture is to contribute its share to the research necessary to maintain agricultural progress in the coming decades, it must be in a position to offer salaries and opportunities such as to obtain and retain men of vision, of training, and of capacity in the leadership of its various projects. That this is accomplished should be a matter of grave concern to the administration of the colleges and stations, as well as to the scientific workers. It is inevitable under our present type of national organization that the ability and attitude towards cooperation of the national leadership of a given project will materially influence its development.

It is almost equally important that the department obtain the right type of young college men as recruits to its force. A high entrance salary standard alone would insure plenty of recruits, but even a moderate entrance salary with great opportunity for further training and advancement would undoubtedly result in attracting the ambitious young man whose growth and development will be the measure of the possibility of research in the years to come.

The standard civil service examination of the department for scientific workers has in the past attracted the best material of the graduating classes. In the last year or two, however, the number taking these examinations has fallen almost to zero, and the quality has deteriorated still more, so that very few of those taking the tests at this time are able to pass.

The graduate school has not only aroused a great deal of enthusiasm among the department workers, but the slight publicity it has already been given has resulted in the receipt of letters from college students asking how they may best shape their courses so as to enable them to obtain entrance to the government service. The school is in its infancy and its problems are yet to be solved. There does, however, appear to be an opportunity and possibility of developing a service to the department workers and a still greater service to the department itself in assisting it materially in its efforts to maintain an efficient personnel.

ALFRED VIVIAN of Ohio. Frankly we have not felt encouraged in the past to urge our graduates, especially our better ones, to enter departmental employ, feeling that the tendency has been to check their development. A research organization should have of the best; but if its effect is deadening instead of inspiring, I am loath to encourage men to enter its employ. If I send you good men, what will be the outcome?

E. D. BALL. Whatever may have been the case in the past, concerning which I express no opinion, I believe that the proposed courses will be thoroughly inspiring to the receptive and alert student. At any rate, the intention is to make them such. Of course, the amount of work which can be offered will be in a large degree conditioned on the numbers of students, their previous training, and upon the fees paid. The courses will cost less than at several high-grade institutions. The effort, so to speak, is one of love and not for profit. We feel that this scheme presents an opportunity for our research men to get into touch with promising young men of diverse training and research experience, not the ordinary graduate school group, that the type of men we want and who would be immensely benefited would be attracted. We feel that the scheme, once it is under

way, will develop rapidly and satisfactorily. Furthermore, it is expected to establish a small number of review courses in order to enable some of our own men who have been with us for a greater or less length of time, to modernize their point of view and get up to date.

A. C. TRUE. The past policy of the department has been in considerable measure to restrict its workers in the matter of taking advanced work at universities or colleges, either local or distant. This policy has recently been changed and a relatively liberal attitude assumed toward resident or non-resident graduate work.

F. B. MUMFORD of Missouri. What machinery has been developed looking toward the securing of advanced degrees? Will work done at the department be recognized elsewhere toward advanced degrees?

E. D. BALL. Tentatively we have decided to certify to the institution to which the student finally goes the amount and quality of the work he has done. If when he comes to us he knows to what institution he wishes his work referred, connections and arrangements are promptly made with it; if he does not, the certification is made after he has determined where he will go.

We now have in hand 20 to 30 applications from our staff members for leave of absence to do graduate work. We are at present inclined to follow the custom quite commonly in vogue at our better institutions, namely, to allow three or more credits yearly in graduate work without loss of salary.

MISS ABBY L. MARLATT of Wisconsin. Is it contemplated to offer work in home economics?

E. D. BALL. Only if a sufficient number register to warrant it. We have circularized our entire departmental staff, have received the preliminary applications, and on the basis of these applications have determined what courses to offer in the immediate future. There have been thus far too few—if indeed any—applications to justify offering home economics courses. It might be well similarly to circularize the land-grant colleges, in which event, a sufficient number of home economics students might be secured to justify the establishment of courses. At present those interested and fitted for such work can perhaps make connections whereby they can do special research work under competent supervision in the Office of Home Economics or could secure instruction in outside institutions. The Federal law under which this work is being conducted specifically provides that departmental laboratories shall be open under appropriate regulations issued by the Secretary to any one who may be qualified to work therein.

T. D. BORD of Louisiana. Has this movement grown out of or has it relation to the National University movement?

E. D. BALL. It is not intended to compete with institutions now in being or to be established. It is meant in the main to offer courses not offered elsewhere in the city in standard-grade institutions. The fundamental idea is the inculcation of the spirit of research and not the establishment of a new or rival institution. If the National University is ever

established at Washington it is probable that this work will be articulated with or turned over to it.

President W. O. Thompson, Ohio State University, addressed the convention on the subject, "The Land-Grant Colleges and the Public Welfare." [We regret that the manuscript of this address was not furnished and the paper must therefore be omitted.—J. L. H.]

The following paper was presented by C. E. Gunnels of the American Farm Bureau Federation:

### THE SUPREME CHALLENGE

BY C. E. GUNNELS

It is my privilege to bring to you on this occasion the greetings of the American Farm Bureau Federation. The farmers of America, in common with other classes, take the keenest pride in our universities. You are to be commended for your splendid contributions to our national welfare.

More than a million farmers and their wives are members of the American Farm Bureau Federation and they are proud of the accomplishments of their federation. You, the American Association of Land-Grant Colleges and we, the American Farm Bureau Federation, are facing the supreme challenge of service. Will we be as proud of our record in the future as we are of our record in the past? Do we have the right viewpoint? Are we approaching our problems from the proper angle? There is no room in America today for prejudice or improper consciousness—we must be first and only American citizens. As good American citizens we each have definite functions to perform. If we are teachers we must look carefully to the business of teaching; if we are farmers we must devote ourselves earnestly to the development of agriculture. We frequently hear that there is an alarming amount of unrest among the people of the world today. Is such a statement true? If we have the right viewpoint may we not conclude that the unrest is a sign of possible progress? The universities of this nation are the potential leaders in the nation's thought; the agricultural colleges and the American Farm Bureau Federation are the potential leaders of agricultural thought. If we live up to the challenge of service is it not possible so to direct the present day tendency critically to examine conditions under which we are living to the end that not disaster but progress will result?

For ages wise statesmen and economists have been telling us that nations must maintain a self sufficiency in the necessities of life. This is only another way of saying that our national agriculture must be made sufficient and reasonably satisfying for both producers and consumers. How best to do this is the real challenge before us. If we meet it, the value of the service rendered is incalculable.

We are in the main a nation of individualists and in our ambition to advance our individual interests we sometimes combine with others to the mutual advantage of those so organized. This tendency has been highly developed in certain commercial undertakings. In fact, its over-development has caused us to seek ways and means of checking abuses that have become evident, as anti-trust legislation and other regulatory measures

passed by our National Congress indicate. The greatest single class of producers in the nation—the farmers—is still to a considerable extent a disorganized mass of individuals with exceedingly varied interests. The folks of the farm are among the last to find a means of organizing in the common interest. Agriculture is not sufficiently prosperous or satisfying today. Under present methods of doing business an unorganized group selling the fruits of their labor to an organized group, and buying back their necessities from another organized group, finds itself in an untenable economic position.

We are approaching the limit of available tillable land. Our population is rapidly increasing. On a prewar exchange value, the present agricultural dollar is worth only about two-thirds of its former purchasing power. Our real farmer population is about one-third of the nation—the other two-thirds of the people are depending upon that one-third to furnish their food and raw materials. Socially we constantly draw upon the farm population to renew the vigor or intelligence of the social body. There has been a tendency in the past, and it will become more and more alarming in the future because of the present condition of agriculture, for men and women to leave the farm and match their wits with people in other occupations. Are we willing as a nation, since agriculture is the basis of national prosperity and existence, to leave to the less capable and less intelligent the production of the necessities of our existence? If we are so wholly dependent upon the agricultural class can we afford to permit the tendency toward material and mental impoverishment longer to prevail?

Let us look at this problem from the largest angle. When we are attempting to solve the problems of agriculture are we not attempting to insure the perpetuation of our national life and to give to our children and our children's children the heritage which they have a right to expect?

Far-seeing farmers of the Nation have been trying for a long time to call attention to this situation. Some of the keenest farmer minds of the present day met in Chicago a year ago last March and formed a national organization, known as the American Farm Bureau Federation. They charged it with the responsibility of dealing with the agricultural problem, first of all from the standpoint of national welfare. They recognized that because we are structurally individualists and not communistic, a satisfying national agriculture meant an agriculture satisfying to the individual farmer. And the organization thus created accepted the challenge to serve us in all humility. Its leaders have made an earnest effort correctly to analyze the factors of the problem. They have clearly recognized their own shortcomings and weaknesses; they have sought aid wherever they could find it.

The United States Department of Agriculture and the agricultural colleges have won the undying gratitude and friendship of the farmers because of the service they have rendered in the fields of production, marketing, and social progress.

During those strenuous days when the American Farm Bureau Federation came into being, we were laboring under an almost world-wide breakdown of foreign credits, we were experiencing a credit stringency in the United States and we had a national over-production of many commodities, especially agricultural commodities, because of conditions induced by the war. That one sentence is eloquent of our present day difficulties. Under

these difficult conditions the American Farm Bureau Federation undertook the development of its service program. It created an organization department that has more than doubled its membership in less than two years. Its cooperative marketing department has brought into being the machinery that is leading to national cooperative marketing of grain, livestock, dairy products, fruits, wool, truck and vegetable products, and others of the principal agricultural commodities. The cooperative cotton marketing plan worked out by State farm bureaus and other organizations here in the South has been endorsed. This work must be extended as fast as time and means at hand permit.

A transportation department was organized and immediately brought forth fruit by aiding in the reduction of the asked for valuation of the railroads under the Esch-Cummins Act to the extent of \$1,700,000,000. At the same time, passenger rates scales proposed by the railroads were revised on application of this department to the Interstate Commerce Commission to the end that passenger rates were raised proportionately with freight rates instead of freight rates bearing the whole burden of the need for increased revenues. This piece of work has saved the producers and consumers of the Nation many millions of dollars.

The information department is telling intelligently to agricultural papers, rural papers, the city press, and magazines the true story of the farmer and his greatest organization. The department of economics and statistics is searching out as best it can with the help of the colleges and the Department of Agriculture the facts upon which an agricultural program must be based. No inconsiderable amount of the constructive legislation of recent months can be traced to the efforts of the Washington office of the federation. There are other departments in existence and being planned.

The farmers of the Nation would like to have the privilege of assisting you in your splendid work as educators whenever occasion demands. They are earnestly seeking your assistance at all times in the solution of their problems. Just now they are wondering about the reorganization of the governmental departments at Washington. We would like to see the maximum of efficiency and the minimum of red tape; we would like to see the maximum economy consistent with efficiency. We view with considerable apprehension proposals totally or partially to dismember the Department of Agriculture. Our forefathers saw fit to establish such a department in the interest of public welfare. We believe the demand for such a department is greater today than ever before in the history of the Nation.

It is reasonable to assume that the various government departments can be modified and simplified to advantage. We endorse such an attempt, but we earnestly hope that before any of the present day services of the Department of Agriculture are taken from the department to be placed elsewhere or eliminated, that the matter be viewed from every angle. We believe instead of elimination or transfer, that the functions of the Department of Agriculture might better be modified and perfected to the end that they are of more service to those whom they are intended to serve.

We are especially interested in the extension work of the Department of Agriculture and the agricultural colleges. After careful consideration, the officers of the American Farm Bureau Federation concluded that farm

bureau work was hindered to some extent by the sharp line of demarcation drawn in many States between men, women, boys and girls. Where each of these lines of work are in charge of a State leader at the college of agriculture, and where these leaders are reporting to separate administrative divisions in the Department of Agriculture, we believe the service program is disturbed on the farm. We cannot separate too sharply the problems of the field and feed-lot from the problems of the home, nor can we separate the welfare of the boys and girls from the welfare of the farm as a unity.

Undoubtedly the first step toward a better organization of extension work has been undertaken when the offices of extension work in the South and North and West were consolidated.

County farm bureaus have found that many of their most intimate problems are state-wide or nation-wide in scope. Indeed, that is the reason for the existence of State farm bureau federations and the American Farm Bureau Federation. County farm bureaus almost universally consider extension work as their first duty. They realize that they must have strong leadership in the extension work in the State and strong leadership at Washington. The programs of work must be sufficiently uniform to obtain maximum efficiency. We are striving for a balanced national agricultural program. Where the artificial sections in an office are unduly emphasized or where work is divided on a sectional basis to too great an extent, we believe the ultimate goal is much more difficult to attain. Only those individuals who completely submerge themselves in striving to develop a great national program for the advancement of agriculture and the welfare of the Nation can ever hope to be real leaders in extension work.

A college of agriculture is one of the most fundamental and necessary colleges in a State university. Its mission is to maintain an intelligent husbandry which will furnish with maximum efficiency an adequate supply of the basic necessities of life. In performing this service its most powerful arm is the extension service, which reaches the actual men, women, and children on the farm. There once seemed to be a tendency in certain institutions to regard the extension service as something improper and to be judiciously suppressed. Let us get another viewpoint. Properly organized and directed, it is the most powerful service agency and builder of public appreciation that a college or university can develop. It deals directly with the people.

National progress and social welfare are waiting a much enlarged research and teaching program in our educational institutions. This assemblage knows better than any other group of people in America how vast is the field yet undeveloped. The need is so great and the means at hand so limited. But opportunity knocks! Powerful organizations are seeking your acquaintance and asking your assistance in the development of national service plans. It is your opportunity to become actual instead of potential leaders of national thought. It is the practical test.

The challenge to practical service if courageously met, means public confidence and support, both moral and financial. It means an adequate development of the educational institutions of the Nation. When this is accomplished, when intelligence and knowledge replace ignorance and prejudice, we need fear no form of vicious propaganda that would sap our national strength or destroy our unity. The American Farm Bureau



Federation asks the privilege of working with you, and at the same time challenges you to the supreme test of service in developing a safe, sane, complete workable program of agricultural advancement. Counter influences, perhaps sincere, certainly misguided, are at work. Let us be courageous in meeting the supreme challenge of service to the end that the influence of our universities, our colleges of agriculture, and the American Farm Bureau Federation may be like exquisite threads of gold woven throughout the entire fabric of our national life.

The following bibliographical report was submitted by A. C. True, States Relations Service, United States Department of Agriculture:

SELECTED LIST OF REFERENCES ON RURAL ECONOMICS AND SOCIOLOGY,  
1913-1921

At the convention of the Association of Land-Grant Colleges in 1920 the Executive Body voted "that the Director of the States Relations Service be asked to furnish annually for publication in the proceedings of the association such bibliographical statements dealing with agricultural matters as to him seem pertinent."

In accordance with this action, the bibliography presented herewith has been prepared under the direction of the Director of the States Relations Service by Miss Martha L. Gericke, Librarian of that Service.

In 1913 a bibliography showing the trend and scope of literature on rural economics and sociology was presented at the twenty-seventh annual convention of the Association of American Agricultural Colleges and Experiment Station and was printed in its proceedings for that year. In view of the intense interest at the present time in problems relating to marketing, rural organization, and farm life it was thought that the association would be interested in a résumé of the progress made in developing the American literature for the period 1913-1921.<sup>1</sup> It was found, however, when assembling the material that the number of publications that might be included in a list of this nature was so great that it was deemed advisable to exclude from the list the publications issued by the United States Department of Agriculture, State agricultural experiment stations and State agricultural extension services, it being assumed that members of the association would have ready access to this material and would be familiar with its scope. In most cases references that present discussion and data bearing either directly or indirectly on rural life problems which have appeared in the publications of various organizations or associations have been omitted. These publications include reports and proceedings of the state country life conferences, the national conferences on marketing and farm credits, American Farm Management Association, farm organizations, bankers associations, and other organizations or associations of similar character.

The list includes 362 titles which are grouped under the following headings arranged alphabetically: Agricultural History and Development 21, Agricultural Land 14, Agricultural Prices 12, Cooperation 17, Cost of Production 26, Farm Labor and Wages 17, Farm Management 36, Marketing 56, Rural Church 11, Rural Credit 35, Rural Economics—General 29,

<sup>1</sup> The literature for 1921 is of necessity incomplete.

Rural Population 11, Rural School 8, Rural Sociology—General 40, Rural Surveys 16, and Tenancy 13. Attention has been called in notes to bibliographies, collateral reading, and lists of references found in books and articles included in this list.

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The following memorial to Winthrop E. Stone, late president of Purdue University, was presented by A. C. True of the United States Department of Agriculture:

#### MEMORIAL TO DR. STONE

BY A. C. TRUE

When last the Association of Agricultural Colleges and Experiment Stations held its annual convention in the South, in 1912, Dr. Winthrop Ellsworth Stone was its president. That year the association celebrated the semi-centennial of the passage of the Land-Grant Act and the act establishing the United States Department of Agriculture.

The presidential address was characteristic of the man. In clear, calm, and forceful language he urged that the colleges and universities represented in this association should be high-grade institutions and should stand together to support such development. "We should," he said, "with common purpose and united energies seek to develop the highest type of an institution in our field in the conviction that the best interests of the single institutions will be promoted by that which strengthens the group and raises the type . . . . The important thing is that our ideas of community interest be strengthened not alone for mutual protection or advantage, but the better to meet the very great responsibilities increasingly impending." He pointed out the dangers arising from the increasing popularity of the agricultural colleges and experiment stations and the rapid spread of the extension movement. There should, in his opinion, be such organization of the extension work that it would not diminish the efficiency of the teaching and research, and such well-defined relations with the United States Department of Agriculture as would ensure that its assistance would invariably be through and with the State institution.

Dr. Stone was first a delegate to this association in 1901, soon after he became president of Purdue University. He immediately took an active interest in the affairs of the association and that year was made secretary of its Section on College Work, moved the appointment of a committee on the making of an exhibit of land-grant colleges at the St. Louis Exposition, temporarily was chairman of that committee, and served as a member during the exposition. The following year he became one of the vice-presidents of the association and in 1903 chairman of the Section on College Work and Administration. For several years he was chairman of a committee on rural engineering, which reported in favor of establishing departments on this subject in the colleges and a bureau of rural engineering in the Department of Agriculture.

At the Baltimore meeting in January, 1919, he presented on behalf of the college presidents a plan for the reorganization of the association. This led to the appointment of a committee on revision of the constitution, of which he was chairman. In this capacity he took a leading part in the movement which led to the revision of the constitution at the Chicago meeting in November, 1919, and the consequent change of the name of the association to Association of Land-Grant Colleges.

Besides serving on various other committees, he was for two periods a member of the Executive Committee and was on that committee at the time of his death.

Among important papers, reports, or discussions by him, reported in the proceedings of the association are those on "A Degree Course in Home Economics in 1905"; "The Development of Engineering Education in the Land-Grant Colleges," delivered in 1907 at the celebration of the 50th anniversary of the opening of the Michigan Agricultural College; "The Selection and Retention of an Efficient Teaching Force"; "Means of Preventing Extravagance and Snobbery Among College Students"; efforts on behalf of engineering experiment stations; discussions on the bills before Congress for Federal aid to extension work and secondary education; and his last report in 1920 as chairman of a special committee on the Smith-Towner Bill, in which the general purposes of the bill relating to the encouragement of education are approved, but Federal control of State and local education is opposed.

Dr. Stone was born at Chesterfield, New Hampshire, June 12, 1862, and spent part of his boyhood at Amherst, Massachusetts, under the shadow of Amherst College and the Massachusetts Agricultural College. His independence and firmness were shown in his determination under difficult conditions to enter college and in his choice of the agricultural college as his Alma Mater. He graduated with the degree of B. S. in 1882.

After spending a year or more as plant physiologist at the Valentine Farm at Mountainville, New York, he decided to devote himself to fundamental studies in chemistry, because in that science he believed there was the best opportunity of learning the factors of growth and response in plants. After a period of graduate study and work as assistant chemist of the Massachusetts Experiment Station under Dr. Goessmann he went to the University of Göttingen, Germany, where he received the degree of Ph. D. in 1888. There he did notable work on pentose sugars and their mother substance under Dr. Tollens, by whom he was highly esteemed.

On his return to the United States he became chemist at the Tennessee Experiment Station and in 1889 was made professor of chemistry at Purdue University, Lafayette, Indiana. For several years he was active in chemical research, particularly on the carbohydrates, to the knowledge of which he made some important contributions.

However, his executive ability was soon recognized by President Smart and he was drawn more and more into administrative work, becoming vice-president of Purdue University in 1892. On President Smart's retirement in 1900 Dr. Stone was made president of the university and held this position until his death, July 17, 1921. Under his administration the work of the university was greatly broadened and strengthened, the faculty and student body very much enlarged and the general influence of the institution materially increased.

As a boy he lived in the hill country of New England, his birthplace being in sight of Mt. Monadnock, and always he was fond of nature and the out-door life. After a visit to the Canadian Rockies in 1906 he spent his vacations as far as possible in that region and achieved considerable reputation as a successful mountain climber. Last summer, with Mrs. Stone, he attempted the ascent of Mt. Eon in Alberta, Canada, and fell to his death just as he had reached the summit. His view of mountain climbing is well expressed in the following extract from his article on "Amateur Climbing" in the *Canadian Alpine Journal*, 1920:

"There is a gospel of the mountains to be preached to the amateur climber as well as to those who have not yet learned to lift their eyes to the hills. The vast mountain ranges are storehouses of health and inspiration to the human race. There is no possibility of their being cheapened or of losing their charm though thousands look upon them and many feet tread their summits. It is the duty of those who have learned in some slight degree to appreciate their wonder to help others to a like enjoyment."

In June, 1921, he delivered at the commencement of the Massachusetts Agricultural College his last public address, in which he clearly set forth his conception of the land-grant colleges. "It is their function," he said, "continuously to interpret and correlate the progress of science with the basic industries by training the men who shall serve the industrial world as its leaders, operators, investigators, and teachers. . . . In their close cooperation with all forward looking movements and agencies to improve the Nation's fundamental industries, these colleges are in the highest degree service institutions, educational at the foundation, but extending their services and reaching the life and welfare of the people in a thousand concrete ways."

By nature and through scientific training Dr. Stone was cautious and conservative. His was the mind of an impartial judge, desiring to have and consider all the evidence for and against each proposition. If he had any bias it was on the side of what had already proved itself good. He especially deplored violent changes from the established order. But he had courage in conspicuous degree and when he was once convinced that a course was right he followed it. Dr. Allen has well said of him: "He had a gentle, quiet nature which preferred harmony but did not fear opposition; a keen sense of humor which not only made him a delightful companion but was of great use to him in distinguishing the really serious situations."

If we should seek to express in a single word the spirit which animated him and the essential element of the message he has left to his friends and the institutions that he loved, can we do better than to take it from Longfellow's poem of the mountain climber who lost his life in the snow of the Alps:

"There, in the twilight cold and gray,  
Lifeless, but beautiful, he lay;  
And from the sky, serene and far,  
A voice fell, like a falling star,  
'Excelsior.'"

#### MINUTE CONCERNING THE DEATHS OF PRESIDENTS STONE AND THACH, DIRECTOR ARMSBY, AND DEAN MACKAY

##### PRESIDENT WINTHROP ELLSWORTH STONE.

Born at Chesterfield, N. H., June 12, 1862.

Died in Alberta, Canada, July 17, 1921.

President of Purdue University, 1900-1921.

##### PRESIDENT CHARLES COLEMAN THACH.

Born at Athens, Ala., March 15, 1860.

Died at Dalton, Ga., October 3, 1921.

President of Alabama Polytechnic Institute, 1902-1920.

**DIRECTOR HENRY PRENTISS ARMSBY.**

Born at Northboro, Mass., September 21, 1853.

Died at State College, Pa., October 19, 1921.

Director of Pennsylvania Agricultural Experiment Station, 1880-1907.

Director of Institute of Animal Nutrition, 1907-1921.

**DEAN CATHARINE J. MACKAY.**

Died at Winnipeg, Canada, August 26, 1921.

Dean Division of Home Economics, Iowa State College, 1910-1921.

President Stone had long been recognized as an administrative leader. He was twice called upon to serve on the Executive Committee and presided over the Atlanta convention in 1912. He was the guiding spirit in the reshaping of our organization, which culminated in the revised constitution, thus making a notable contribution to the development of our association. Especially interested in the military features of our institutions, he effectively furthered the work of the Reserve Officers' Training Corps.

President Thach was born in the far South shortly before the outbreak of the Civil War. His life work was done in his native State. He was a man of dynamic force and nervous energy. His strong personality will long be remembered by those of us who have attended the conventions of the last score of years.

Director Armsby's fine scholarly qualities found expression in a wholly different channel. In the guidance of research activities his counsel and judgment were invaluable. His reputation in his chosen field of animal nutrition was international. He was, as it were, a charter member of the association, attending the convention of 1885, was one of our first secretaries, and in 1899 was the recipient of our highest honor, the presidency of the association.

Dean MacKay was a recognized leader, indeed a pioneer, in the relatively newer field of home economics. Her marked administrative ability and inspiring leadership were potent factors in bringing this field of human endeavor to a plane of scientific value.

In the passing of these four workers, two in the fullness of years and two in the height of their strength and power, the association has suffered a loss that can now scarcely be realized; but the merits of their labors will not be forgotten.

On motion, the convention adjourned *sine die*.



## MINUTES OF THE SECTIONS

### SECTION OF AGRICULTURE—RESIDENT TEACHING

TUESDAY MORNING, NOVEMBER 8, 1921

The meeting was called to order by Dean R. L. Watts, Pennsylvania State College. D. J. Crosby, New York State College of Agriculture, was chosen temporary secretary.

The report of the Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts, was presented by A. C. True, States Relations Service, United States Department of Agriculture, as follows:

#### REPORT OF COMMITTEE ON INSTRUCTION IN AGRICULTURE, HOME ECONOMICS AND MECHANIC ARTS<sup>1</sup>

##### IMPROVEMENT OF COLLEGE TEACHING IN VOCATIONAL SUBJECTS

This twenty-fourth report of the Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts is a continuation of the report presented at the Springfield, Massachusetts convention of this association in 1920.<sup>2</sup> The data for this report were collected in 1920, with the exception of replies from presidents or deans of eleven colleges received this year in response to a second request for information from these sources. Lack of time prevented the completion of the report soon enough for the Springfield meeting of the association. A report of progress dealing with the qualifications of college teachers, their teaching experience, and the number of subjects they were teaching was therefore made, leaving for this year's report questions dealing with difficulties in doing good teaching, opportunities afforded and means employed to improve teaching and to keep up to date in vocational practice, bases for the promotion of teachers, and the relations of college teaching to research, extension work, and outside employment.

*Difficulties in Attempting to do Good Teaching.*—The difficulties most frequently mentioned by college teachers as interfering with good teaching are those of a material nature, such as lack of suitable laboratory equipment, library facilities, reference material, and classroom supplies. Other difficulties frequently mentioned are lack of time for preparation, lack of assistance, too heavy classroom duties or other duties, inadequate preparation, lack of experience in teaching, and inability properly to present subject-matter or to adapt the courses to the needs of students, or to relate the teaching to the problem and to actual practice.

The replies of college teachers to another question as to the means they have employed to analyze and improve their own methods of teaching have an important bearing on the difficulties that they encounter. These replies indicate comparatively little systematic or conscious self-analysis, and still less application of the experimental method, such as conducting tests with different groups of students or varying the method and check-

<sup>1</sup> The States Relations Service employed Prof. D. C. Crosby, New York State College of Agriculture, to collect and summarize the data and prepare the report for the consideration of the committee.

<sup>2</sup> See Proc. Assoc. Land-Grant Colleges, 1920, pp. 67-79.

ing results. On the other hand, many have attempted to observe the results on students and their ability to apply knowledge, to compare their own methods with those of other teachers, and to get the opinions of students and alumni.

The reported lack of laboratory facilities and classroom supplies undoubtedly is in many cases a real obstacle to good teaching. It may be due to shortage of funds or to improper requisitioning. We suspect that it may also be due in part to difficulties at least partly within the reach of teachers to remedy, such, for example, as the lack of facilities or the inventive genius or professional background for teachers themselves to prepare laboratory apparatus, illustrative materials, outlines, manuals, or text-books. It is pertinent to this discussion to ask whether all of the ills of inadequate teaching facilities could be cured by providing funds for their purchase, or might the teachers help materially by giving more time and thought to the preparation of helps that will better meet their needs.

Another difficulty in doing good teaching, which is mentioned in 24 percent of the replies, is lack of time for teachers to prepare for classes. Closely related to this difficulty are lack of assistance, nearly 10 percent of replies; classes too numerous or too large, more than 21 percent; pressure of other duties, nearly 7 percent.

A fair question to ask in this connection is whether the technical teacher who attributed his difficulties mainly to lack of material resources has a sufficient professional background to realize the fact that many of these difficulties are such as a broad professional outlook might obviate. Many of the teachers of enduring reputation have done their work in small institutions with scant funds and meagre equipment.

Your committee's belief that many of the difficulties in doing good teaching might be due to lack of professional training has been strengthened by the fact that some of the college teachers confess inadequate preparation, lack of experience in teaching, and inability properly to present subject-matter or to adapt the courses to the needs of the students, or to relate the work to the problem and to actual practice. Adequate professional training might also enable teachers who complain of too onerous duties to see that some of their tasks are self-imposed and unnecessary. When classes are too numerous it may be due to unavoidable causes, or may be due to the fact that the teachers' subject-matter has been divided into too many courses, a very common fault in these days of extreme specialization.

Your committee recommends that both administrative officers and teachers give careful study to the obstacles to good teaching and means of surmounting them, and that through committees or the employment of experts some means be devised to analyze and measure good teaching.

*Opportunities Afforded for Teachers to Improve their Work.*—Returns from forty-two of the land-grant colleges indicate that ten of them grant sabbatic leaves, twelve grant leave by special arrangement without pay, and five by special arrangement with part pay. Omitting duplicates, 60 percent of the forty-two colleges grant leave for professional improvement in addition to the regular vacation periods, which latter vary in the several institutions from one month to three and one-half months. Only eight of the colleges provide vacation periods of three or more months.

At the Massachusetts Agricultural College, teachers are employed for twelve months, with the definite understanding that two months of this time are for professional improvement and one is for vacation.

Departmental conferences and seminars, mostly dealing with the technical aspects of subject-matter rather than with teaching methods, are held in thirty-three of these colleges, opportunity for part-time graduate work or study in summer-schools is given in fourteen, and occasional lectures on methods of teaching for the faculty in two.

The replies indicate that in a few of the institutions quite general advantage is taken of the opportunities to do advanced work or to acquire professional training; in one-third of the institutions teachers rarely take advantage of such opportunities; and in eight of them (19 percent) both presidents and members of the staff agree that there are no opportunities for professional improvement. In several other institutions there is disagreement between members of the faculty as to whether opportunities for professional improvement are or are not afforded.

As to the number of teachers who have been absent for study, the replies from 411 teachers indicate that nearly 80 percent of them had been absent once at least, about half of them in vacation periods.

Our studies indicate that to the extent that opportunities to get away from the home institution for professional improvement are available and are well understood by college teachers, fairly good use is made of them. The experience of two or three institutions in developing special conferences, or in employing special lecturers to aid college teachers in their effort for professional improvement, shows that much can be accomplished in this way. It seems pertinent, therefore, to suggest:

(1) That college presidents, deans, and heads of departments study their own facilities for helping their teachers to improve their work.

(2) That a definite policy with reference to sabbatic leave and other leave for professional improvement, be adopted by each college, and that all of these facilities be made known to all of their teachers.

(3) That teachers be encouraged in every way possible to study at other institutions where good opportunities for professional study are offered. It would be a good thing if colleges had funds that could be made available to pay the expenses of a few of their teachers each year to attend summer schools at other colleges.

*Keeping Up-to-date in Vocational Practice.*—The question as to what means they used to keep up-to-date in vocational practice was evidently misunderstood by many of the teachers, who thought of "vocational" as applying to teaching rather than to farm work, home making, or shop work.

Disregarding the replies that showed misunderstanding of the question, it is evident that a considerable number of the college teachers make a practice of spending their vacations in shops, on farms, in home or institution work, or in consultation, commercial, or extension work, for the purpose of keeping in touch with vocational practices.

As to the effect on teaching of this vocational work, twenty-six of the heads of colleges believe it to be beneficial, two think the effect is not pronounced, and six, who report elsewhere that few or none of their teachers engage in vocational practice, believe that such work has an ill effect. Where experience can be taken as a guide, therefore, the conclusion must

be that administrative officers believe vocational practice related to the subject matter under consideration is beneficial to teaching.

Just how much outside work or vocational practice is deemed beneficial to teachers, the committee has no way of judging; doubtless the amount varies with the individual and with the profession. But from replies to other related questions it is safe to assume a general belief that all teachers can with benefit to their teaching employ much of their vacation time in vocational practice, certainly to the extent that such practice is recreation.

One limitation of vocational practice that will commend itself to all is to the effect that teachers should not assume responsibility for outside enterprises to such an extent as to cause them worry over the details of management or of heavy financial obligations. Such worry would undoubtedly be reflected in loss of enthusiasm in the classroom.

*Measures to Determine the Success of College Teachers.*—How to measure the success of a college teacher seems to be one of the most difficult problems in college administration. More than half of the institutions reporting employ some sort of supervision, two have departments of education working on some of the problems, and six analyze term marks as one of the means. Others seek the opinions of associates, students, and alumni or suggest estimating the "quality of product"—the success of alumni; but here again comes the difficulty of measuring the success of alumni and of determining the teacher's share in that success. All recognize the difficulty in finding a satisfactory yardstick. Many suggest supervision as a partial solution, and some are specific in urging the employment of a supervisor or a dean of resident instruction to keep closely in touch with the work of teachers, to discuss with them their methods of teaching, to inspect their examination questions, analyze their distribution of high and low grades, and to inquire into their interest in teaching, their recognition by professional societies, and their standing in the college community.

All of these suggestions appeal to the committee as good ones. No one method is suited to all occasions, nor will the sum of them solve the problem completely. We append to this summary many excellent suggestions that are worthy of study and would call particular attention to the following thoughtful analysis of the problem:

"Perhaps the best measure would be to require a study of good teaching among the teachers in the institution and to frankly eliminate teachers who in the end do not measure up to the joint standards of the faculty. A single individual is likely to sadly misjudge teaching quality because of teaching prejudices. One person may like a good lecturer, another a good text-book worker. The good teacher is the teacher who can get the student to develop himself, who can lead the student so that he will develop himself, who can cause the student to think on his own account. Independent thinking is not necessarily memorization. I am inclined to think, therefore, that the best measure that the college could take would be to so arrange matters that a definite amount of study individually and by the faculty group as a whole was put upon the teaching problem. If some way could be found to measure the amount of original thinking the students are doing, you would be able to determine the success of teachers. Until such a method is found, we will have to wait in many cases until later years to

determine which teachers have really been successes. Our immediate impressions are likely to be at fault."

*Basis for Promotion of College Teachers.*—The problem of judging a teacher's right to promotion is largely one of measuring his success as a teacher and his capacity for growth. The committee has tabulated in this report the collective suggestions from 428 teachers. These suggestions include such items as ability to develop successful students, to inspire students, and popularity with students—items that contribute to successful teaching.

But success in teaching, whatever that may be, is not considered the only criterion for promotion. Ability to do advanced work and to grasp subject matter is frequently mentioned, as are also advanced degrees, study in other institutions, research, personality, character, the extent and character of his professional studies, his service to the community, his initiative and originality, and his ability to cooperate with other members of the faculty.

The conclusion of your committee on this problem is that responsibility for the promotion of teachers must be placed with the college administration, which should apply first the best available measurements of good teaching and, secondly, all those other tests of industry, character, and capacity for growth that measure one's worth to a community.

#### EXTENT TO WHICH A TEACHER CAN ENGAGE IN CERTAIN OTHER PURSUITS WITHOUT DETRIMENT TO HIS TEACHING

In the questionnaire sent to college teachers this question was asked: "To what extent do you think a teacher can engage in research, book-making, farming, business, or other pursuits, and still do his full duty as a teacher?"

As might be expected, participation in a limited or a moderate amount of research work was favored by nearly all teachers. It was thought to be essential to the best success of the teacher. The preparation of books was also quite generally approved, as were other related avocations to a less general extent. The following quotation from a dean of resident teaching is a very clear statement of opinion, which the committee is glad to endorse:

"It seems to me fair to assume that an institution is employing a man for full time and that such outside vocational activities should be engaged in only if they contribute to his teaching efficiency. If that attitude can be maintained, there is no real division of interest. I do think there is danger that there would be division of interest.

"The relation between research and teaching is not on quite the same footing, for our institutions really hire men to do both at the same time. I believe it desirable that a differentiation shall go on in this respect and it is, in fact, already in progress. Some men should be employed primarily for research. Those who are primarily teachers should certainly conduct research, but with the same attitude as that just referred to in relation to outside vocational work; namely, the research should be taken specifically for its bearings on the man's teachings. I am not ready to believe that a mediocre teacher is likely to be much improved by carrying on a quite unrelated piece of research.

"Teaching, research, and extension should be regarded as coordinate and equally honored. A man should choose one of these fields, as his major interest and should be free to engage in the other activities for their effect on his major work. But he should not be given great responsibilities in his subordinate lines."

The responsibility of the heads of institutions with reference to this matter differs in some respects from that of the teacher. The latter may properly desire and should have the opportunity to do some research or extension work. The college president should, however, consider carefully how this research or extension work is to be related to the organized research or extension work which the institution is carrying on. It may not always be best for the teacher to be a member of the staff of the experiment station or extension division. The research or extension work which the teacher is able to do, after his teaching duties are performed, may be too desultory or too unrelated to the organized program to make it worth while or proper for him to be a part of the organization engaged in systematic research or extension work.

*Outside Employment of College Teachers for Pay.*—Both administrative officers and teachers were asked what attitude the college should take toward teachers engaging in outside employments for pay.

Two-thirds of the replies from administrative officers and nearly three-fifths of the replies from teachers were favorable to remunerative outside employment in vacations, but with some reservations to the effect that such work be related to their teaching or that it do not interfere with their work as teachers. Nor was there much change of alignment on that phase of the question which referred to outside employment for pay during the college year. The discussion seemed not to turn on the ethics of accepting pay for outside work, but upon the relationship of the work to the efficiency of the teacher.

Nearly two-thirds of the administrative officers frankly admitted that the policies of the institutions, or of the teachers, are to an extent influenced by low salaries, but a considerable number urged that, regardless of salaries, teachers of vocational subjects can not render the best service to their classes upon what they glean from books, and that if they do work of commercial value they should accept pay at commercial rates.

After all, this is a question that each institution must decide for itself. Most of the teachers in the land-grant colleges are on salaries derived in part at least from State funds and they should conform to State regulations. In some States they would not be permitted to accept pay from outside sources while in the employ of the college; in others the laws and regulations are silent on this matter.

*Do Teachers Honor Their Profession?*—College presidents were asked to state their opinion of the attitude of college teachers toward teaching, as distinguished from research, lecturing, bookmaking, or vocational pursuits occupying more or less of their time and energy.

Many of the administrative officers replying to this question misunderstood it and gave their own views of the relations that should exist between teaching and other pursuits rather than their view of the attitude of college teachers toward them. Of those who interpreted the question correctly, nearly two-thirds submitted replies that indicated not only no

neglect of teaching, but greater devotion to it as a result of participation in these other activities.

There was some indication of a loss of interest in teaching, due in part to the financial situation and to the increasing attractiveness of "certain phases of research, lecturing, and vocational pursuits," but in the main, research was thought to contribute more to than it detracted from teaching. To some extent it was looked upon as a preparation for teaching. There should be no conflict between them.

Your committee believes that college is fortunate which is able to employ men and women who love the atmosphere and the work of college halls or shops or fields and then is willing to let these men and women work themselves into the fabric of the institution, as woof or warp, in whatever capacities they can best work and best contribute to the advancement of knowledge and truth. If a faculty of such men and women are made financially comfortable and given such responsibility as they deserve in the shaping of policies in the college community, there will be little need to worry over division of time as between teaching, extension, and research or devotion to duty as between college affairs and outside employments.

A. C. TRUE,  
A. B. CORDLEY,  
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#### APPENDIX

##### DIFFICULTIES IN ATTEMPTING TO DO GOOD TEACHING

The greatest drawback to good teaching in the land-grant colleges, according to the teachers who responded to a request for an enumeration of the chief difficulties in attempting to do good teaching, is lack of laboratory facilities and other material equipment. Out of 636 answers from all sources 224, or more than 35 percent, mentioned this as one of the chief difficulties. If we add to these 55 who mentioned inadequate library facilities and reference material and 60 who referred to lack of suitable textbooks, we have 339 suggestions that the lack of purchasable laboratory and classroom supplies is a leading difficulty in doing good teaching.

In this connection it is interesting to note that in 57 percent of the 42 institutions furnishing information as to means employed to make sure that teachers have appropriate accessories for instruction this matter is left to the deans and heads of departments, while in 94 percent each teacher makes his own requisition for materials. The lack of suitable accessories for teaching is not, however, an indictment of the method of selecting or procuring them; it might well be due to shortage of funds, for more than 60 percent of the institutions have elsewhere indicated that their policy

with reference to teachers receiving pay for part-time outside employment is more or less affected by low salaries.

This deficiency might also be accounted for in other ways, such for example, as lack of time or facilities or the inventive genius on the part of the teachers themselves to prepare laboratory apparatus or equipment, charts, lantern slides, manuals or text-books. It is pertinent to this discussion to ask whether all of the ills of inadequate teaching facilities could be cured by providing funds for their purchase, or might the teachers help materially by giving more time and thought to the preparation of helps that will better meet their needs.

Another difficulty in doing good teaching, which is mentioned in 24 percent of the replies, is lack of time for teachers to prepare for classes. Closely related to this difficulty are lack of assistance, nearly 10 percent of replies; classes too numerous or too large, more than 21 percent; pressure of other duties, nearly 7 percent.

A fair question to ask in this connection is whether the vocational teacher who attributed his difficulties mainly to lack of material resources has a sufficient professional background to realize the fact that many of these difficulties are such as a broad professional outlook might obviate. Many of the teachers of enduring reputation have done their work in small institutions with scant funds and meagre equipment.

Your committee's belief that many of the difficulties in doing good teaching might be due to lack of professional training has been strengthened by the fact that some of the college teachers confess inadequate preparation, lack of experience in teaching, and inability properly to present subject-matter or to adapt the courses to the needs of the students, or to relate the work to the problem and to actual practice. In a few cases the students are said to be poorly prepared, the classes too small, or the work too heavy for the students.

One teacher in the education group, who seems to have given this matter careful thought, sums up his difficulties as follows: "In general—making the subject-matter function to the attainment of the knowledges, skills, and ideals set up as aims; in particular—bringing the work assigned to students to be done outside of class in proper relation to the class period, making sure of the possession by the students of the material necessary as a basis for discussion without resorting to too much telling."

Others in the education group find difficulty in "supplying adequate opportunity for expression of pupil initiative," in acquiring "a sufficient control of such phases of the teaching process, as questioning, making assignment, creating motive, as will result in mental activity of the student to the highest degree," in "getting pupils to improve methods of study, to get away from memorizing things not understood, to weigh values, to hold the tentative attitude, to see associations" and "to do individual work," in "adaptation of subjects to occupy full time and attention of higher grade students without leaving hopelessly behind the poorer students," and in a tendency on the part of instructors "to neglect preparations for any particular recitation."



## DIFFICULTIES IN ATTEMPTING TO DO GOOD TEACHING

Types of difficulty	Times mentioned	Percentage of total mention
<i>Total answers</i> .....	636	...
Lack of laboratory facilities and other material equipment .....	224	35.2
Lack of time for preparation .....	154	24.2
Too many or too large classes .....	136	21.5
Lack of preparation of students .....	104	16.3
Lack of student interest in required subjects .....	82	12.9
Lack of assistance .....	62	9.7
Lack of suitable text-books .....	60	9.4
Lack of library facilities and reference material .....	55	8.6
Lack of preparation of teacher .....	44	6.9
Inability to properly present subject-matter .....	42	6.6
Too many duties other than teaching .....	41	6.4
Lack of experience in teaching .....	30	4.7

## MEANS EMPLOYED TO ANALYZE AND IMPROVE METHODS OF TEACHING

The replies to the question as to means employed by teachers to analyze and improve their own methods of teaching indicate comparatively little systematic or conscious self-analysis (less than 12 percent of replies) and less application of the experimental method (2.7 percent), such as conducting tests with different groups of students or varying the method and observing contrasted results.

A much larger proportion (45 percent) employed the method of observing the results on students, including the results of examinations and the ability of students to apply knowledge. Almost as many (44 percent) compared their own methods with those of other teachers. Other favorite methods were to seek in various ways the opinions of students (17.5 percent), to read professional literature and pursue advanced courses of study (14 percent), to attend conferences and conventions (7.6 percent), and to observe the work and get the opinions of former students and alumni (6 percent).

## MEANS EMPLOYED TO ANALYZE AND IMPROVE METHODS OF TEACHING

Typical answers	Times mentioned	Percentage of total mention
<i>Total answers</i> .....	657	...
Observing results on students, including results of examinations and the ability of students to apply knowledge .....	296	45.
Comparing methods with those of other teachers .....	289	44.
Seek criticism of students .....	115	17.5
Reading professional literature and pursuing advanced studies .....	92	14.
Study own methods—self-analysis and use of personal score card .....	77	11.7
Attending conferences and conventions .....	50	7.6
Observing the work and getting the opinions of alumni and former students .....	40	6.
Seek criticism of other teachers .....	30	4.6
Experimental method—tests with different groups of students and varying the method and observing results .....	18	2.7

## OPPORTUNITIES AFFORDED FOR TEACHERS TO IMPROVE THEIR WORK

According to returns from forty presidents or deans of land-grant colleges, ten of these institutions grant sabbatic leave as follows: Leave with two-thirds pay, California; with two-fifths pay, Arizona; a year's

leave with one-half pay or one-half year with full pay, Illinois, Kansas, Maryland, Minnesota, Montana, New York (Cornell), North Dakota, and Utah. North Dakota, in addition to the usual sabbatic leave arrangement, permits teachers, after four years' service, to take leave one semester on half pay. Leave by special arrangement without pay is granted by twelve of the colleges,<sup>1</sup> mostly those that do not grant sabbatic leave, and occasional leave with part pay is granted by five colleges.

The opportunities for study in vacations differ with the terms of employment, which vary from eight and one-half months in Nevada and in the College of Engineering of Cornell University to twelve months in eleven of the forty institutions<sup>2</sup> furnishing records on this item. Between these extremes are six institutions that employ teachers for nine months, four for ten months and four for eleven months. In four institutions there are periods of employment of different length. At the Massachusetts Agricultural College teachers are employed for twelve months with the definite understanding that two months of this time are for professional improvement and one is for vacation.

By far the most common method employed for improving teachers is through departmental conferences and seminars which are held in 33 of the 42 institutions sending replies to this question. The indications are that in most cases these seminars deal with the technical aspects of subject matter rather than professional methods. In fourteen institutions opportunity is given for part-time graduate work or for study in summer schools; in two, occasional lectures for the faculty are provided, and in three, no definite policy has been developed.

Apparently the opportunities for professional improvement at the institution or away from it are not in all cases well understood by members of the teaching staff. For example, the president of one college states that sabbatic leave is granted, while six replies from assistant professors and professors in that institution make no mention of sabbatic leave, and only one mentions it. Possibly some college teachers do not think of sabbatic leave as an opportunity for professional improvement. Twenty-two other institutions are listed by some members of their faculties as affording no opportunities for professional improvement, either at the institution or away from it. In the case of eight of these institutions, the replies of the presidents agree with those of the members of the staff, but in the others, they do not. In these other cases the presidents mention departmental conferences and seminars, opportunities for part-time graduate work and occasional leaves of absence by special arrangement as opportunities available to members of their staff. It is also true that other members of these same institutions find opportunities for professional improvement. For example, one university is mentioned by some members of its staff as affording no opportunity for professional improvement, but others mention occasional leave, departmental seminars, occasional travel,

<sup>1</sup> Leave by special arrangement without pay is granted by the colleges in Arkansas, Georgia, Kansas, Mississippi, Nebraska, New Jersey, Oregon, Rhode Island, Tennessee, Virginia, Washington and West Virginia; with part pay in Massachusetts, Michigan, North Dakota, Pennsylvania, and Texas.

<sup>2</sup> Twelve months is the term of employment in the following States: Delaware, Kentucky, Massachusetts (Agr.), Minnesota, Mississippi, New Jersey, Oklahoma, South Dakota, Tennessee and Virginia; eleven months in California, Connecticut, Georgia and Washington; ten months in Florida, Montana, Pennsylvania and Vermont; nine months in Arizona, Maine, Massachusetts (Tech.), New York (Agr.), Rhode Island, and Wisconsin.

library facilities and occasional opportunity to attend conferences and summer vacations, as opportunities for improvement. There are at least six other noteworthy examples of institutions mentioned by some of their teachers as affording no opportunities for improvement and by others as giving several of the opportunities mentioned.

#### USE MADE BY COLLEGE TEACHERS OF OPPORTUNITIES FOR PROFESSIONAL IMPROVEMENT

The replies from administrative officers of the colleges indicate that in a few institutions like those in Illinois, Minnesota, New York, Pennsylvania, Tennessee, and Washington, quite general advantage is taken of opportunities to do advanced work or to improve their methods of teaching. On the other hand, fourteen of the institutions or 33.33 percent of the replies state that members of their teaching staff rarely take advantage of such opportunities, or use them to a limited extent only. Some of the replies indicate that the teachers of vocational subjects give less attention to improving their methods than do teachers in other college subjects.

As to the number of times that teachers have been absent for study, out of 411 replies there were 325 who had been absent one or more times. Of these, 121 were absent with pay; 48, without pay, and 156 in vacation periods.

Classified by subject matter the figures show that 90 teachers of agriculture, 115 teachers of home economics, 90 teachers of engineering subjects, and 30 teachers of education had been absent for study. Expressed in percentages based on the total number of replies in each subject-matter division, the showing would be for agriculture, 22.7 percent; for home economics, 103.6 percent; for engineering, 47.3 percent; and for education, 58.8 percent. The apparent discrepancy in these percentages, as indicated by a percentage of 103.6 for home economics may be accounted for by the fact that some teachers took leave in two or more ways, that is, with pay, without pay, in vacation. Notwithstanding this discrepancy, the figures evidently show that to a considerable extent advantage is being taken of whatever opportunity there may be to get away for study.

#### MEANS OF KEEPING UP-TO-DATE IN VOCATIONAL PRACTICE

The teachers were asked to tell what means they used to keep up-to-date in vocational practice. By "vocational practice" the committee meant the practice of farming, of home making, or of engineering, but the replies indicated that many of the teachers were thinking of the vocation of teaching or of methods of teaching. Such things as correspondence, graduate study, attendance at conventions and at summer schools, and visits to other schools or classes are not very good ways of keeping up in the practice of farming or home making or engineering.

There is also some question whether reading current literature, which was mentioned in more than 80 percent of the replies, is a very effective means of keeping in close touch with practice on the farm, in the home, or in the shop. Better ways would seem to be working on farms or engaging in commercial work in vacations, which were mentioned by nearly 17 percent of the teachers of agriculture; or home work, mentioned by more than 17 percent of teachers of home economics; or shop work and consultation,

mentioned by nearly 54 percent of engineering teachers and by nearly 19 percent of home economics teachers. Other means employed and the percentage of teachers mentioning them were: Personal observation and experiment and visiting other shops, 32.6 percent; attending meetings and conventions, 42 percent; study and research, 11 percent; and personal contacts through extension work, 40 percent of teachers of agriculture and home economics.

Administrative officers of the colleges, asked to estimate the extent to which their vocational teachers engage regularly in farming, engineering, or home-making outside of teaching duties, 48 percent replied "to a limited extent," 29 percent indicated a considerable number following this practice, and three replied that none engage in vocational practice or that it is not encouraged.

#### MEANS OF KEEPING UP-TO-DATE IN VOCATIONAL PRACTICE

Typical answers	Times mentioned	Percentage of total mention
<i>Total answers</i> .....	745	...
Reading current literature .....	601	80.6
Attending meetings and conventions .....	315	42.3
Personal observation and experiment, visiting other institutions and shops .....	243	32.6
Study and research .....	87	11.6
Work on farms and commercial work in summer ..	63	16.7*
Home work .....	19	17.3†
Shop work or consultations—		
Engineering teachers .....	113	53.8
Home economics teachers .....	13	11.8
Personal contacts through extension work .....	197	40.4‡

\*Percentage of replies from teachers of agriculture.

†Percentage of replies from teachers of home economics.

‡Percentage of replies from teachers of agriculture and home economics.

#### EFFECT OF ENGAGING IN OUTSIDE VOCATIONAL WORK ON TEACHING

The attitude of twenty-six (69 percent of replies) of the heads of colleges is clearly in favor of teachers engaging in outside vocational work related to the subjects they teach; they believe the effect is beneficial. Six believe such work has an ill effect and two think the effect is not pronounced. In the case of these eight executives, however, it may be noted that their replies to a previous question indicated that few or none of their teachers engage in vocational practice. Where experience can be taken as a guide, therefore, the conclusion must be that vocational practice related to the subject matter under consideration is considered beneficial to teaching.

Just how much outside work or vocational practice is deemed beneficial to teachers, the committee has no way of judging; doubtless the amount varies with the individual and with the profession. But from replies to other related questions it is safe to assume a general belief that all teachers can with benefit to their teaching employ much of their vacation time in vocational practice, certainly to the extent that such practice is recreation.

Some teachers of engineering subjects go so far as to say that teachers should spend one-third or one-half of their time in the practical work of the profession. Certain teachers of agriculture have said that it is a good

thing for teachers of this subject to own and manage farms, but that the details of the farm operations should be left to competent superintendents.

One limitation of vocational practice that will commend itself to all is to the effect that teachers should not assume responsibility for outside enterprises to such an extent as to cause them worry over the details of management or of heavy financial obligations. Such worry would undoubtedly be reflected in loss of enthusiasm in the classroom.

A further discussion bearing on this question will be found under the topic, "Extent to which a teacher can engage in certain other pursuits without detriment to his teaching."

#### MEASURES TO DETERMINE THE SUCCESS OF COLLEGE TEACHING

How to measure the success of a college teacher seems to be one of the most difficult problems in college administration. Sixty-eight percent of the administrative officers who gave the committee information as to the means they are employing, mentioned some sort of supervision, mainly by the deans and the heads of department, but whether this plan resulted in satisfactory measurements of successful teaching was not disclosed. In eight institutions (28 percent of replies) conferences are held to discuss and criticize methods of teaching, and in two the departments of education are working with the technical departments in an effort to improve teaching methods. In six of the colleges some attention is given to the analysis of term marks as a means of determining whether the teacher is successful. In other institutions (14 percent) the opinions of associates are considered; the results obtained with students (21 percent) are weighed; the opinions and attitude of students (36 percent) are given consideration; and the opinions and success of alumni (10 percent) are studied.

The recommendations from teachers themselves, 195 of whom made suggestions, were overwhelmingly in favor of basing the success of teaching on the success of alumni or on the "quality of product." This was the burden of 87 percent of the suggestions, and while it is undoubtedly a good standard for the biographer, often it is a little slow for the man or woman who should now be turned toward some vocation other than teaching or for the real teacher who should be given substantial recognition before the age of retirement comes. This difficulty is clearly recognized. The next table shows that in addition to those who would base the value of teaching on the success of alumni, nearly 37 percent of the suggestions favor the devising of some plan for keeping in close touch with the alumni and getting their opinions. Such a plan, if successful, would be helpful to the colleges in many other ways.

#### MEASURES RECOMMENDED TO DETERMINE THE SUCCESS OF COLLEGE TEACHERS

Suggestions	Times mentioned	Percentage of total mention
<i>Total answers</i> .....	542	...
<i>Number of answers containing suggestions</i> .....	195	...
Success of alumni—quality of product .....	170	87.1
Visits to classes by administrative officers .....	137	70.2
Attitude of students toward teacher .....	111	56.9
Opinions of upper classmen .....	102	52.3
Supervision .....	92	47.1
Opinions of alumni .....	72	36.9
Interest of teacher in his work .....	71	36.4
Opinions of co-workers .....	57	29.7

Another large group favor some sort of supervision of the teacher's work—not "critical inspection" with a view to "prescribing the methods of teaching," but supervision by constructive and helpful suggestion. Forty-seven percent of the teachers who made suggestions speak of this service to teachers as "supervision," while 87 percent call it "visits to classes" by heads of departments or by administrative officers. One teacher writes that "the complaint uttered very often by college teachers that no one knows of nor pays attention to classroom ability in rating the teacher, is not without some justification."

As to means of providing supervision, various suggestions are made, such as employing a supervisor of instruction or a dean of resident teaching or by having deans, heads of departments or other "superior officers" keep closely in touch with the work of teachers, discuss with them their methods of teaching, inspect their examination questions, analyze their distribution of high and low grades, and inquire into their interest in teaching, their recognition by professional societies, and their standing with the better students and with alumni. While strictly speaking, these are not all items in the supervision of teaching, nevertheless they are undoubtedly valuable factors in judging the success of a teacher. For, as one correspondent points out:

"The teacher should not be rated entirely upon his success in the classroom; nor yet should he be rated entirely by his activity in affairs outside the classroom. I have the feeling that no teacher may long continue to teach successfully who does not devote a considerable portion of his time, either by research or practice, to development of his specialty."

Another means of determining the success of college teachers is said to be the "attitude of students toward the teachers." This way is mentioned by nearly 57 percent of those who made suggestions. Getting at the "opinions of upper classmen" is mentioned by 52 percent. The dangers of rating popularity too highly are also pointed out. One correspondent says:

"The only real way in measuring the success of a college teacher is to analyze the later behavior of his students and that takes years. Popularity with students is not always a measure of a teacher's success. I have known, and know now, a number of college teachers who are exceedingly popular with students on the campus as undergraduates. Some of these teachers are very unpopular with their own alumni. That is, the students find out in life the shortcomings of the teacher who was popular with them as undergraduates. Of course many popular teachers retain their popularity, and justly so."

Discussing means of getting good teachers and measures of good teaching, this correspondent continues:

"Perhaps the best measure would be to require a study of good teaching among the teachers in the institution and to frankly eliminate teachers who in the end do not measure up to the joint standards of the faculty. A single individual is likely to sadly misjudge teaching quality because of teaching prejudices. One person may like a good lecturer, another a good text-book worker. The good teacher is the teacher who can get the student to develop himself, who can lead the student so that he will develop himself, who can cause the student to think on his own account. Independent thinking is not necessarily memorization. I am inclined to think, therefore, that the best measure that the college could take would be to so arrange matters that a definite amount of study individually and by the

faculty group as a whole was put upon the teaching problem. If some way could be found to measure the amount of original thinking the students are doing, you would be able to determine the success of teachers. Until such a method is found, we will have to wait in many cases until later years to determine which teachers have really been successes. Our immediate impressions are likely to be at fault."

The suggestion made by this man that there should be a study of good teaching by all members of the teaching staff is in close accord with studies that are now being made of the objectives of teaching. One teacher summarizes his suggestions along these lines as follows:

"(1) Clarification of objectives of teaching—for the college, for department, for courses. Setting up of standards in terms of these objectives. Measuring efficiency in terms of the quantity and quality of the product produced.

"(2) Something may be learned of the quality of a teacher's work by inference from direct observation, e. g., if his thinking is wholly in terms of subject-matter, if he thinks of himself as primarily a forester, for example, and only secondarily as a teacher, if he considers his teaching as incidental to his real work in research; if on the other hand he does no research whatever, if he delegates as much as possible of his teaching work to his assistants, it may be inferred that his teaching will be less effective than that of another of whom this is not true, other things being equal."

That there should be some definite organization in the college to encourage and promote good teaching is suggested by not a few college teachers. One states his opinion in the following paragraph:

"Every college should have a teacher-training department whose business should be to train teachers for secondary schools and to improve the teaching in the college. Before improvement in the college can be carried out intelligently a cooperative working agreement must be effected between heads of departments and their dean and the dean and the director of teacher-training. There must be created in all a desire to do good teaching and the heads of departments must check up on their instruction."

#### BASIS FOR PROMOTION OF COLLEGE TEACHERS

The problem of judging a teachers's right to promotion and of selecting the judge is well stated by one teacher, as follows:

"Of course, college teachers should be promoted because of their ability to teach. How to judge that ability is the most difficult problem. Our own institution leaves that judgment largely to the head of the department concerned. Undoubtedly, such a method will cause some injustice because of misjudgments on the part of the head of the department and prejudices which he will inevitably have. Successful teaching and its judgment must be left to someone. If some equitable standard can be established by which to judge such teaching, promotion could be made automatic. Until such a criterion is at hand, however, promotion must be left to the recommendation either of an individual or of a group of individuals. It would probably be best by careful study to devise questions in different subjects which would really bring out the mental development of students in that subject and thus really measure the efficiency of the teacher. But we are not at that point yet, despite some recent developments in psychological analysis. Such a line of investigation is promising enough to be worthy of continuance."

This is a statement of the problem, but not a solution of it. The collective suggestions from 428 correspondents are shown in the table below:

## BASIS FOR PROMOTION OF COLLEGE TEACHERS

Typical answers	Times mentioned	Percentage of total mention
<i>Total answers</i> .....	635	...
<i>Number of answers containing suggestions</i> .....	428	...
Ability to develop successful students .....	329	76.8
Ability to do advanced work and grasp subject matter .....	218	50.9
Ability to inspire students .....	176	41.
Experience, years of service .....	175	40.8
Interest in work and in institution .....	107	25.
Personality—Character .....	99	23.1
Popularity with students .....	80	18.7
Professional study .....	59	13.8
Ability to cooperate with other members of faculty .....	43	10.
Merit, initiative, originality .....	43	10.
Breadth of training, advanced degrees .....	26	6.
Community service .....	24	5.6

From this table it will be seen that a very large proportion (nearly 77 percent) of the replies would base the teacher's right to a promotion on his ability to develop successful students, which is not much different from "success of alumni—quality of product," which was given first place among suggestions for measuring the success of college teachers. This is just another way of saying that promotions should be based on success in teaching, which is approximately the same answer given by 47 percent of administrative officers. "Ability to inspire students" is probably just another phrase meaning success in teaching, but it is specifically mentioned by 41 percent of teachers.

But success in teaching, whatever that may be, is seldom considered the only criterion for promotion. Ability to do advanced work and to grasp subject matter are measures proposed in 51 percent of replies from teachers. In addition to these, 30 percent of administrative officers mention "advanced degrees," "study in other institutions" and "research" as indications of a teacher's worthiness for promotion.

The teacher's personality, his character, his popularity with students, the extent and character of his professional studies, his service to the community, his initiative and originality, and his ability to cooperate with other members of the faculty are all factors of frequent mention for consideration in promoting teachers.

Length of service is an item to be taken into consideration, but it does not assume a prominent place in the replies from teachers, nor is it ever mentioned alone. Nor can ability to teach be considered alone, especially in the case of many members of the agricultural and home economics staffs who may, in addition to teaching duties, be required to carry on investigations or to do extension work.

One correspondent writes that positions "should be definitely graded to begin with—instructor, assistant professor, associate professor, professor—with a definite maximum salary attached to each," and that a successful teacher "should be steadily advanced in salary and in title until he has reached the maximum in each." The alternative to this suggestion is that the teacher who is not "steadily advanced in salary and in title" may assume that he is not successful and seek other employment.



**EXTENT TO WHICH A TEACHER CAN ENGAGE IN CERTAIN OTHER PURSUITS WITHOUT DETRIMENT TO HIS TEACHING**

In the questionnaire sent to college teachers this question was asked: "To what extent do you think a teacher can engage in research, book-making, farming, business, or other pursuits, and still do his full duty as a teacher?"

The following table shows in a quantitative way how teachers look at this matter of outside employment, but figures can not show the diversity of opinion expressed.

**EXTENT TO WHICH A TEACHER CAN ENGAGE IN OTHER RELATED OR UNRELATED PURSUITS WITHOUT DETRIMENT TO HIS TEACHING**

	Extent of participation favored			
	Not at all	Limited extent	Moderate extent	Limit not indicated
Research .....	9	106	170	28
Preparation of books.....	2	61	82	11
Related vocational work.....	8	47	85	6
Related business .....	10	47	49	4
Unrelated or recreational work...	18	28	32	1
General replies .....	69	160	45	28

As might be expected, participation in a limited or moderate amount of research work met with the approval of a larger number of teachers than did any other related or unrelated pursuits. Next to research in favor came the preparation of books, then related vocational work, and related business. Only about 16 percent of the 714 teachers who replied to this question indicated their belief that teachers should refrain from all employment other than teaching.

Not a few of the committee's correspondents expressed the opinion that a certain amount of work other than teaching is not only permissible but essential to the continued best success of the teacher. While it is recognized that "the average college teacher with a full schedule can do very little in the way of outside pursuits," yet it is just as evident that hard and fast rules can not be laid down if the "freedom, initiative, and growth" of the college man "are to be considered." Much depends upon the individual, his training, experience, and aptitude. In general, however, he should engage in other work, as one teacher puts it, "to the extent that it will contribute to the effectiveness of his teaching" or, as another has written, "to the extent where such avocation is, in point of effort involved, recreation from the tedium of classroom."

While there is considerable concert of opinion to the effect that outside employments are necessary to keep teachers "up-to-date, alive, and keen," that a teacher out of touch with research deteriorates, and that "research work, some extension work and farming all aid in giving the teacher (of agriculture) a practical viewpoint," nevertheless, there are some who take a contrary view or who point out dangers inherent in some of the current practices now in vogue. For example, one teacher writes that "the most approved method, where feasible, is teaching one-half year and research the other half," and another that "every teacher should do some research but not while teaching—part of the year should be definitely given to each," while others see dangers even in such an arrangement, especially if it is a requirement.

On this phase of the discussion one teacher writes: "Every teacher should have a research problem for his own good, but he should not be required to do both teaching and research." Another, somewhat more conservative, says: "Personally, I believe that a teacher should have no other pursuit to distract his attention, though it is a practice in most institutions, especially in land-grant institutions where there is an experiment station, to have a man devote a portion of his time to research and the other portion to teaching. Theoretically, this sounds like an ideal combination, but in practice it does not work out satisfactorily."

In one way or another, quite a number of college teachers express the opinion that outside employments of the kind mentioned should be engaged in only as means of obtaining recreation and that the active management of any large enterprise other than teaching should be avoided. In general, however, the opinions of teachers of agriculture are pretty well summarized in the following statement:

"It has been my observation that the teaching is usually of a better grade if the teacher does at least a small amount of investigational work as is also true if time and care are taken to place his lecture notes in shape for publication. The active management of a farm or other business enterprise is usually detrimental to the best teaching because of the excessive amount of time and thought required, although to own and operate such an enterprise through competent superintendents is often beneficial."

The opinions of teachers of engineering do not differ materially from those in agriculture, especially when we take into consideration the fact that they have less opportunity to engage in organized, publicly supported research work and that fewer of them can be owners of, or partners in, business enterprises related to their teachings; so that they must depend upon various industrial concerns for such contacts as they may have with research or with pursuits other than teaching. Characteristic opinions of men prominent in engineering instruction are given in the following quotations:

"My best teachers have been those who stood at the top rank of professional engineers and authors. I do not believe that a man can do justice to his teaching work if he devotes any considerable percentage of his time to pursuits not along the line of his profession."

"One who can succeed in this, as in the other businesses, must be enough bigger than his job to be able to take on some outside activities, else he becomes narrow. His other work must, however, be of very minor importance in his estimation, else his school work suffers."

"To only a rather limited extent. As soon as outside activities begin to occupy a major part of an instructor's time, his work as a teacher is almost certain to suffer. On the other hand, a limited amount of practical work along the line which the instructor is teaching, I believe to be of great importance. Pursuits which do not react favorably on his special line should only be pursued to a very limited extent, and principally from a recreational point of view."

"A teacher should be encouraged to engage in research, bookmaking, and other activities which are closely related to his profession. Active interest in business or pursuits not related to his profession should not be greatly encouraged."

This from the dean of an engineering school:

"To a far larger extent than is now usual! True, he should not miss any or at least not many classes, but schedules should be properly arranged to permit his 'outside work,' for its benefits to him and his class are big.

He should be made to realize that his first duty is to the college, also. Get away from the one-time truth "Those who can, do; those who can't teach!" Contact with the business world will get a lot of foppishness out of the heads of many college teachers; those in mathematics, English, languages, etc., need to become men!"

#### OUTSIDE EMPLOYMENT FOR COLLEGE TEACHERS FOR PAY

*Opinions of Administrative Officers.*—College presidents and deans were asked the following questions: "What attitude should the college take toward outside employment of teachers in bookmaking, consulting work, or other employment for pay, (a) during the vacation periods, (b) during the college year?"

Two-thirds of the replies to this question were favorable to outside employment for pay during vacation periods, while eight others (19 percent) were in favor of such employment provided it did not interfere with college duties. Only two (4.8 percent) could be said to be distinctly unfavorable to vacation employment for pay. The reason given in these cases was that vacation periods should be for complete relaxation and recreation.

Regarding outside employment of teachers for pay during the college year, three of the presidents (7.1 percent) were distinctly favorable and thirteen (30 percent) were unfavorable, while eighteen (43 percent) qualified their replies so as to indicate a favorable attitude toward such employment in case it does not interfere with their duties as teachers, the assumption being in several cases that the work under consideration be related to the subject matter handled by the teacher.

*Policies Affected by Low Salaries.*—The college presidents were also asked how far their policy as to outside employments for pay were affected by low salaries. The replies indicated that while the policy of the institutions might not be affected, the practice was in many cases largely influenced by low salaries. Out of 42 replies, 13 were to the effect that the policy of the institutions was not affected by low salaries, but several of these added that the policy of individuals is affected, thus intimating that if salaries were fully adequate, fewer individuals would seek outside employment for pay. Twelve replies indicated that the institutions were slightly affected and 13 that they were greatly affected by low salaries, while the president of one institution said that its policy was entirely determined by low salaries. Among those who replied that their policies were not affected by low salaries were some who argued that no matter how high salaries might be, they would encourage their technical teachers to seek outside employment at times for the sake of contact with practical affairs related to their special fields.

*Opinions of Teachers.*—The individual teachers were also asked what policy toward outside employment for pay the colleges should pursue, provided salaries were made reasonably adequate. The drift of their replies is indicated in the following table:

## POLICY TOWARD TEACHERS ENGAGING IN OUTSIDE EMPLOYMENT FOR PAY

Typical answers	Times mentioned				Percentages of total mention			
	Agr.	H. Ec.	M. A.	Educ.	Agr.	H. Ec.	M. A.	Educ.
<i>Total replies</i> ....	332	117	205	51	...	...	...	...
Yes .....	165	30	68	17	49.6	25.6	33.2	33.3
No .....	163	65	50	13	49.2	55.6	24.4	25.5
Yes—if helpful or of value to the institution .....	1	21	32	21	.3	17.9	15.6	41.2
Yes—if he does his college work.....	3	1	55	..	.9	.9	26.8	...

## SUMMARY OF TABLE

	Number	Percentage
Favorable to outside employment .....	413	58.7
Opposed to outside employment .....	291	41.3

This table indicates a fairly even division of opinion, but with a slight preponderance of votes in favor of outside employment for pay, especially if the employment is of value to the institution or does not interfere with the teacher's college work. But an analysis of the replies shows rather conclusively that in the opinion of teachers, if salaries are made fully adequate, no need would exist for the making of definite rules regarding outside employment for pay. As one teacher puts it: "If salaries were reasonably adequate, it should be unnecessary to engage in outside employment for pay except only where such outside employment lies directly and closely in connection with the regular work and is of such a nature as not to interfere with it."

Assuming adequate salaries, therefore, the question seems in the minds of most teachers to resolve itself into that of divided or undivided attention to teaching—which is better? One teacher says of outside employment: "Prohibit it—interest divided." Another writes: "Should be prohibited. The live teacher will keep well abreast of current practice and the application of principle. He can do this more adequately by travels and personal contact with farmers and others actively engaged in agricultural pursuits than he can by engaging in business for himself."

The teachers quoted seem to assume that the college employs all of the time of its teachers; others maintain that "after having a fair teaching schedule, a man should be able to do what he pleases with his time, so long as the university does not suffer," or that "the college ought not to own its teachers nor control their time beyond a reasonable working day." Those who argue in this fashion apparently do not consider the teachers as anything more than employees, as hired men and women working to schedule, and not as component parts of the college who might help as much in their own way to determine its policies and contribute to its success as do the president, the deans, the trustees, and the students.

On the other hand, there is a kind of college freedom recognized by many, which is that of a democracy, a freedom which imposes individual responsibility, without too much of the restraint of clock and schedules. It is with this view of the college community of purpose and this attitude toward their associates, apparently, that the following contributions to this discussion have been made by college teachers:

"They should always be encouraged to do such an amount as contributes to the ability to teach the subject in the light of latest professional practice."

"A teacher should not be employed unless his teaching is satisfactory. If his teaching is satisfactory, I do not feel that the college should be concerned with whether he plays golf for recreation, health, or pay, or whether he farms for recreation, health, loss, or profit. If a teacher needs to do these things in order to improve his teaching, he should be allowed to, and his pay adjusted in accordance with his results in teaching."

"Another point I am particularly interested in is the question of how teachers can keep up-to-date and alive in their chosen professions without being permitted to do outside professional work. No matter how high the salaries may be at any institution they will not compensate for the lack of personal contact with the outside work. I believe that institutions should not only permit but encourage instructors to do certain amount of professional work. This not only inspires confidence in the teacher but in the students themselves, and the teacher also has greater confidence in his ability to 'put across' the most recent and up-to-date methods in his chosen profession and 'put them across' in a way that will be most practical and valuable to the student."

"Regardless of remuneration, the engineering teacher can not render the best service to his classes upon what he gleans from books. His value must depend upon the broad practical experience he must gain from meeting practical problems in his line. These problems, or few of them are to be found in college walls. If he sticks too close to those walls, he, like them, will grow moss. However, this outside work should interfere as little as possible with his duties before his classes."

#### THE DIFFERENTIATION OF COURSES

The teachers were asked what effort in their opinion the teacher should make to adapt his courses to the aims of different students, as for example, to those who are to become teachers or investigators or practitioners.

The replies were in the ratio of 5 to 2 in favor of adaptation of courses to the aims of undergraduate students and as 32 to 1 in favor of adaptation for graduate students. Practically the only arguments advanced against the principle of adapting courses to the aims of undergraduate students were that undergraduate courses should deal only with fundamentals and that teachers and investigators should specialize only after graduation.

On the other hand, many of the teachers called attention to difficulties that interfere with the success of any plan for adapting courses to the aims of students. Two of the chief difficulties were lack of definite aim on the part of many undergraduate students and inability to section classes sufficiently to provide for students with different aims.

Two of the means most frequently suggested for providing courses adapted to the various aims of students were sectioning classes, particularly for students in the upper years, and giving special problems to small groups of students. In cases where it is not possible to accomplish the desired aim in one of these ways, it was made clear that the interests of the majority in the class should govern and that in no case should fundamentals be sacrificed to method or to special demands.

Some of the teachers who discussed this question recognized the fact that the vocational courses in the land-grant colleges have different aims and purposes than do the arts and science courses and that most of their students looks upon their work as professional preparation. Pursuing the

discussion along these lines, one teacher says: "In a professional school the course should be shaped definitely to the needs of the students in special fields. This involves sectioning classes on this basis. If a teacher has in a course students with a variety of professional aims, he probably can not do much specifically to meet their professional needs."

In most of these colleges the work during the first year or two years is much the same for all students and thereafter elective or differentiated for groups. Keep this fact in mind, one teacher writes that differentiation is "absolutely essential, at least after second year of student's course, if the student is to be trained most effectively for meeting the type of problems found."

Essentially the same opinion is expressed by a teacher in another State, who says: "Differentiation should be made. Perhaps general courses for all and then specialized courses to meet the needs of different groups if the groups are large enough to warrant, if not, differentiation within the course should by all means be provided."

#### DO TEACHERS HONOR THEIR PROFESSION?

College presidents were asked to state their opinion of the attitude of college teachers toward teaching, as distinguished from research, lecturing, bookmaking, or vocational pursuits occupying more or less of their time and energy.

Many of the administrative officers replying to this question misunderstood it and gave their own views of the relations that should exist between teaching and other pursuits rather than their view of the attitude of college teachers toward them. The point of view of those who interpreted the question correctly may be summarized as follows:

There were five replies indicating some neglect of teaching, loss of desire to teach, and reduction of efficiency in teaching as a result of interest in research, lecturing, vocational pursuits, and the preparation of books. On the other hand, nine replies indicated not only no neglect of teaching but greater devotion to teaching as a result of participation in these other activities. Two administrative officers stated that they find a desire among their teachers for some research work.

The views of a few of the college presidents are given in their own words in the following paragraphs:

"It is one of the most unfortunate conditions I have found that our men's time is so completely taken up with teaching that they have very little opportunity for research or bookmaking. Fortunately, the majority of our agricultural faculty are employed jointly by the experiment station and the college and consequently do some research. I wish it were so in engineering. Our professors understand that their first duty is teaching and that this is a duty which they can not get away from, consequently whatever research and other outside work they undertake is done only in time which can be spared from their instructional duties. I consider this very unfortunate, as it has a tendency to perpetuate the same methods and content which may become out of date. I believe that our teachers would welcome a relief from some of their teaching, in most cases, in order that they might do more of the other type of work and I think they ought to have it."

"It is my belief that at the present time there is a tendency toward slight preparation and that there is evidently a decreasing interest in the profession of teaching. On the other hand, there are certain phases of

research, lecturing and vocational pursuits which have become exceedingly attractive and are calling for increased attention. It is apparent that economic pressure is causing greater reluctance to engage in teaching and that the fields named are attracting greater attention."

"In this institution, there is increasing emphasis on research and tendency to safeguard time for this purpose. This has worked to the advantage of the teaching, as there is a tendency in young institutions to offer a larger number of courses than the progress of the science warrants. General lecturing has not appealed widely to teachers, and bookwriting has generally to wait on the requirements of teaching and research. In general, teaching has clearly the first place in the minds of the staff and the welfare of the student is the first consideration."

"There is, of course, no general statement that can be made. There are teachers who enjoy teaching and become so engrossed in it that research, lecturing, bookwriting, etc., have no temptation for them. They devote their lives and strength to teaching. There are others who, for the sake of the opportunity for research which a department affords, are willing to accept employment which carries with it more or less teaching, but gives considerable opportunity for research."

"The average teacher is interested in his or her teaching quite as fully as in the research, etc. I believe that in quite recent years the dignity and importance of teaching have become more obvious to the average instructor in our college."

"A teacher who loves teaching esteems it above all else, and I doubt if good teaching is obtained when a teacher gives thought and energy to anything other than teaching. So the man who puts money or other interests above his teaching, the attractions of business will soon wean away from teaching."

That college is fortunate which is able to employ men and women who love the atmosphere and the work of college halls or shops or fields and then is willing to let these men and women work themselves into the fabric of the institution, as woof or warp, in whatever capacities they can best work and best contribute to the advancement of knowledge and truth. If a faculty of such men and women are made financially comfortable and given such responsibility as they deserve in the shaping of policies in the college community, there will be little need to worry over division of time as between teaching, extension and research or devotion to duty as between college affairs and outside employments.

Alfred Atkinson, Montana State College, stated his belief that it is vital for the administration to be generous in providing for sabbatic leave, and called attention to the fact that in the Montana college, a fund of \$2,500 is provided to make needed adjustments in salaries for supplying teachers when members of the faculty are absent on sabbatic leave.

E. J. Kyle, Agricultural and Mechanical College of Texas, called attention to a desirable mutual arrangement with the director of the experiment station by which it is possible for teachers to take up research problems and for experiment station men to do some teaching.

R. A. Pearson, Iowa State College, told of a definite plan in operation in Iowa, by which assistants, instructors, and assistant professors with the approval of the head of the department, may take as much as five hours of graduate work without loss of salary, and additional graduate work with the loss of one-twelfth of their salaries for each additional hour taken.

T. H. Eaton, Cornell University, presented the following paper:

## IMPROVEMENT OF COLLEGE TEACHING

BY T. H. EATON

## CLEARLY DEFINED OBJECTIVES

Agricultural colleges, in response to the demands of society and of students, turn out, not just educated men, or scientifically trained men, but men who are to perform specific tasks in relatively specific departments of life; for example: Plant pathologists, economic entomologists; farm managers, fruit growers, dairy farmers, market gardeners, farmers (general); buttermakers, cheesemakers, poultrymen, foresters, association managers; farm bureau agents, extension specialists, club leaders, high school teachers of agriculture, laboratory assistants, departmental instructors; and others.

Each of these men requires, to meet the problems of the life into which he goes, certain specifically appropriate abilities and degrees of ability. He must possess certain attitudes or points of view in dealing with men, with ideas, and with things; certain technological facts and principles in dealing with men, with ideas, and with things; certain skills in dealing with men, with symbols, and with things. These attitudes, knowledges, and skills, it is the function of the college to develop, in so far as formal education, home life, occupation, and community association have not already developed them. What the total of these may be, in any typical case, what part of that total should represent the contribution of the college, is very far from being determined. We proceed largely on empirical assumption. Further, though we have recognized as essential certain attitudes, certain knowledges, and certain skills, we have in no case made any accurate study of the degree of proficiency in any ability which the college graduate should possess. When we have made careful study of what demands life makes upon the apple grower in our State, upon the dairyman, upon the high school teacher of agriculture, upon the county agent, upon the poultry extension worker, etc.; of the particular abilities and degrees of ability which each must possess to enter into that department of life; and when we discover which and how much of such abilities the public school, the home, the farm, and the community are properly to be charged with, then we shall be in position to enter upon a scientific organization of curricula and of courses.

In the long period during which we must wait for anything like an accurate formulation of sociological objectives, it is not necessary that we mark time, particularly not within the subject divisions or courses, assigned to various instructors. There is plenty of material which is organizable for ends that we already recognize as direct, as well as plenty of dead wood for which we are unable to find any specific need.

A college course is, or ought to be, an ordered series of stimuli to experiences on the part of students—experiences which shall effect changes in action, thought, or feeling in the student, such as will govern his conduct of life in situations of a type reasonably well foreseen. The college instructor who would make an effective course must have knowledge, (1) of the type of situation for which he prepares a student, (2) of the specific changes that must be effected in the student in order to meet that type of situation, (3) of the type of experience which will most probably bring



about the desired change, and (4) of the stimuli which will most probably result in the effective experience. In certain courses it is relatively safe to assume that the mere fact of entering implies the need to attain particular skills, knowledges, or points of view. If a student enters a course in buttermaking, in artificial incubation, it is a practically ignorant instructor who can not specify quite clearly the skills, the technology, and the point of view that the course should give him. It is in courses of larger scope that our difficulties arise. If, in a course in organic quantitative analysis it be safe to assume that every student should be made master of a certain laboratory technique, is it equally certain that in a required course in soils mastery of a laboratory technique is a proper objective? In how many of our initial courses in soils and chemistry are the data of meanings serviceable to the majority of students, which might readily and easily be given by demonstration, smothered in the routine of dictated manipulative technique, the "writing up" of stereotyped descriptions, and the recording of inaccurate and not significant data! If it be fairly safe to assume that the prospective doctor of veterinary medicine should be able accurately to name and place the bones in the skeleton of a horse, is it equally safe to assume that every student of animal husbandry should be able to do the same? In what department of life to which students of agricultural college devote themselves is it necessary or desirable that a man should be able to chart the origin, type, conformation, color, standard weight, disposition, etc., of twenty-six breeds of horses? Why should even a dairyman be able to describe the likenesses and differences of Kerry and Dexter cattle? Why should even a prospective orchardist be able to make seven forms of graft? Why should anybody, in these days, be able to tie every knot in the repertoire of the able seaman of the days of the clipper ship? To what end is undertaken the memorization of the name, date of birth, and date of death, of twenty-two eminent horticulturists? In what way will it contribute to the self realization or social efficiency of any graduate of the agricultural college that he be able to recite rapidly and clearly the advantages and disadvantages of every form of underdrain which civilized man has tried and discarded? I suggest only from my own experience examples which have given my conscience trouble.

Some additions in the light of known objectives are possible, as well as emendations. Many have already been made. When I was a student at the agricultural college I learned that I should feed my grain and hay and silage in pounds per animal. On the farm I never did so, and few farmers do. I fed my grain in quarts, my hay in forkfuls, my silage in scoopfuls or parts of a bushel. Now students are taught by laboratory experience that the rule "a pint is a pound the world around" does not hold in feeding grains: they learn what a feeding of silage means in terms of bulk, and, in rare cases, how much is three pounds of hay. In my days in the agricultural college I learned how to keep fairly neat accounts in a book, but I never learned what to do with them when I had made them. Now, in some colleges more is done in teaching the interpreting of accounts than in making them. I learned that applications of nitrate of soda at the rate of fifty pounds to the acre in cool weather are profitable on grassland, but I wasted a good many dollars in nitrate on the farm before I was able to make fifty pounds go evenly over anything like an acre. I should like to meet the college student who by virtue of his college education can do

it. I learned to select quite surely the better cows in a herd of dairy cattle, but not how to tell whether any one of the better ones was worth the price asked, and I did not learn anything about judging young stock—the kind the farmer buys. There are still many things that the dairy farmer, or the county agent, or the junior project leader, or the teacher of agriculture, must surely “know and be able to do” to succeed, which neither his upbringing, nor the public school, nor the college teach him, as well as many that serve him, nor society not at all, which they do attempt to teach him.

To have, and to hold to, specific teaching objectives derived from the needs of the man to be taught is the first requisite to good organization of college teaching. The teacher who sees clearly what he is trying to accomplish, like the man who knows whither he is bound on a journey, is far more likely to get there than the most experienced methodician or traveller who does not.

#### THE SPECIFIC NATURE OF EDUCATION

A citrus growers' association may be a marvelously efficient organization for the marketing of oranges, a Ford factory for turning out cheap motor cars, a Hoe press for printing newspapers, but for capturing a fort, getting students into college, or draining a swamp, not one of them possesses efficiency or organization at all. An alarm clock has no meaning in terms of mowing grass, nor a two-horse mower in terms of keeping time. Every organization of material or process takes its meaning as organization from the end it serves. In industry we do not build a machine and then hunt for a product adapted to it. But in education sometimes we fit the purpose to the established machine.

We college men are guilty here. Professors of education, professors of science, professors of agriculture are prone to the injection of new courses into college curricula, of new topics and exercises and assignments into courses; to hold to old courses and old topics in courses, for which they are hard put to it in the exercise of academic ingenuity to find a purpose. A retired skipper tried to sell a farmer his ancient sloop. “What good’ll she do me?” said the farmer, “I’m forty miles from water.” “Well,” said the skipper, “she’s broad and she’s sound, she’s faced the seas for many a year, and I’ll put on a coat of aluminum paint.” We find the same pertinent arguments very convenient at times.

But that colleges have different purposes, that young men in a democracy are entitled to develop their abilities and serve their fellows in particular types of living, and not in life in general and service in general, which nobody lives and nobody renders, is distinctly recognized in the foundation of the colleges of agriculture and mechanic arts. Within those colleges, too, curricula are differentiated, departments are specialized—in animal husbandry, dairy husbandry, poultry husbandry, farm management, teacher-training, landscape art, forestry, electrical engineering, hydraulic engineering, and a host of others. Within those curricula and those departments further differentiation progresses in the courses offered—orchard management, incubation, farm accounting, buttermaking, cattle feeding, vegetable gardening, *ad infinitum*. All that, not because of culture, or discipline, or broadening, and a host of mysterious values which they may

or may not possess, but because of recognition that particular ends call for particular means, that specific purposes determine specific organization. Common sense, the product of generations of experience, has taught us that education is direct. Historically all major studies have originated in that conception. Only when they have ceased to serve the purpose for which they were established do they become tools of "discipline." I have no doubt that, when Henry Ford's synthetic milk has driven the dairy cow from the earth, when eggs are made at Niagara Falls of Erie water and slag and the atmospheric exhalations of Buffalo, dairy husbandry and poultry husbandry will find their place among the fundamental disciplines. In the absence of cows and hens they will become sufficiently abstract and difficult.

Experimental psychology, still in its infancy, and noisy like an infant, but like an infant, real and to be dealt with, has brought forward data in support of common sense in education, just as has genetics in support of common sense in breeding. Its hypotheses are, probably, as tenable and securely founded as those of the infant science of genetics and in like manner they confirm and clarify the dicta of experience. Bakewell's "like begets like" is not cast out by the discoveries of Mendel and DeVries, but confirmed and clarified. Mental discipline is not cast out by the discoveries of Thorndike, but confirmed and made explicit. Directness becomes the heart of discipline.

A man profits from one experience just in so far as that experience is like to that which later follows. In so far as a situation designed for teaching involves elements to be found in that for which it prepares, it is effective, and no further.

Now, that situations of life do possess elements in common is a very fortunate fact. In the absence of it there could be little effective education. But the range and scope of likenesses is much less than we have been wont to assume. We are accustomed to admit that manual skills are relatively narrow in their application—to recognize that skill in milking has no correlation with skill in dissection. In the same way, if less definitely, we recognize that factual knowledge has its limitations—that knowledge of the primary colors of the spectrum has no function in the classification of coleoptera or the selection of phosphatic fertilizers. But we too commonly take comfort in the belief that we can develop, through specific teaching, attitudes and points of view and concepts of methods that are applicable in all sorts of situations. One reason, for example, why we give a student credit for a successful showing in high school geometry is because, we say, it has taught him "the way to think." We give, as one reason for granting him credit for a four years' struggle with Cæsar and Cicero and Vergil that it "has taught him how to work." We require of the student that he shall demonstrate understanding of physics and of chemistry, in order that, for one thing, he may gain the "scientific method" or an "open mindedness" functional in all departments of life.

But we grant no credit to the student who has managed his father's farm, because, even if it did teach him to think, that is a different kind of thinking from the other. To be sure it may be more like the kind of thinking he will have to do in life than the mathematical analysis and synthesis, but we pass that over. We grant no credit to the boy who has done the daily chores for the past ten years or who works his way through

college, because, after all, it has taught him how to work in a very different kind of work from that we expect in college. We do not grant that all our scientifically trained colleagues approach the problems of training their own children, of regulating the conduct of the student body, of laying out the departmental budget, "from the scientific point of view"; nor do we admit that professors of physical science are specially endowed with open-mindedness in respect to questions of politics, of religion, of ethics, or even of education.

In other words in our practices, if not always in our professions, we accept the fact that even attitudes, points of view, so-called general concepts of methods, are confined to a relatively small group of situations, after all. College teaching will be much strengthened when we carry this practice over into the making of our courses.

#### TEACHING IN APPROPRIATE SITUATIONS

There is one very simple rule of sound teaching that is found even in the most introspective and theoretical of chapters on association, as well as in the texts of the most mechanic behaviorists. Dr. Thorndike states it tersely: "Put together those things you wish to go together." But hardly a day goes by in which we do not as teachers violate it. If you expect the principle of the lever to function in connection with the hitching of a team or the use of jack-screw, teach it in connection with an evener and a jack-screw; if you expect the Mendelian principles to function in connection with the breeding of poultry, teach them in connection with the breeding of poultry instead of tall and dwarf peas; if you expect the principle of exercise and effect to function in connection with the teaching of shop work, teach it in connection with shop work, and not in connection with spelling.

We are right in insisting upon the importance of principles, because principles, in pedagogical terms, are the common elements that bind together varying situations. But we are wrong in attempting to teach principles abstractly and apart from the kinds of situations in which they are found in life. Further, we have overlooked in doing so, the most effective way of teaching principles. A student grasps a principle when he abstracts it, and he can not abstract except he have something from which to abstract. Besides, even college graduates are rarely called on, outside of college, to deal with principles in the abstract. They are asked to use principles in connection with specific cases. That so often they fail even to recognize them in specific cases is because they have met them in very different circumstances, if not as completely bereft of circumstances as was possible. I doubt if one sophomore in a hundred would recognize Annette Kellermann in a street costume.

The more closely the learning situation approximates the life situation the more certain it is to be educative. We have come past the stage of judging stock from lantern slides—if we haven't come to the stage of recognizing that farmers do not select cattle by a ring-judging system—and cattle judging does to some extent function. We have come in horticultural courses to preparing seed beds, and setting plants, and pruning trees, instead of merely telling how we would prepare a seed bed, set a plant, or prune a tree. We do run traverses now in the field, instead of

merely on the blackboard, although the run of graduates probably find it seldom necessary to do either.

College teaching is surely improving in respect to approximating the life situation. But there is a vast deal to be done yet. There are college seniors who have constructed on paper a half dozen model dairy barns, who have rarely been inside the college barn or any other that approached a model, much less made systematic study of an actual building. There are college seniors who can diagram perfectly the working of the King system of ventilation, yet who can pass through a barn totally unaware that it has such a system in operation. There are college graduates who can accurately interpret an IQ table, who could not by test determine whether a boy belonged in grade 8 or grade 11. We still have students making forged bolts, though the farmer has long since resorted to Sears & Roebuck.

In a good many cases it is impossible under college conditions to duplicate very closely the life situation, but in a great many more it is possible to come much closer to it than we do. It is highly encouraging that we are more and more using farms as the basis of farm management studies, dairies to teach dairy industry, machines in operation to teach machine operation, the soil of the fields to teach the character of field soils, the trees of the orchard to teach identification of disease and insect injury, and so on. No group of colleges excels the land-grant colleges in that respect. But there is room for a vast expansion in the use of college, farm, industrial, institutional, and other community resources to the end that the learning situation may reasonably approximate that for which it professes to prepare.

#### CORRELATION AND UNIFICATION

The fences that bound the domains of the various college subjects remain, for the most part, too high and too well barbed. Life is not fenced off in any such independent fashion. That farm mechanics and physics should be isolated from one another, so that the farm mechanics instructor must teach his own physics, that chemistry should be so isolated from soils that the soils teacher must devote a considerable effort to teaching chemistry, that educational psychology and methods in agricultural teaching should be strangers to one another, is unfortunate, but often true. Pure science courses should be brought down to actual life cases with sufficient frequency, and the scientific implications of so-called practical problems developed sufficiently, so that science and art interpenetrate and unify the experience of the student.

One further result of this isolation has been noted by administrators—that is duplication. A class of senior students reported to me that they had studied the topic of plant propagation from the same text in three different courses, that they had read the same five chapters of Van Slyke, in *Soils*, in *Fruit Growing*, and in *Farm Management*, respectively. I have studied Mendel's experiments with peas in *Genetics*, in *Animal Breeding*, in *Poultry Husbandry*, in *Botany*, and in *Psychology*. Now a certain amount of recurrence of identical data if they be interpreted from a new angle, and in a new situation, is an excellent thing from the pedagogical standpoint, and in line with the process of correlation and unification

which is so desirable. But that it may lead, and does lead, to waste of time and effort, and to deadening of the students' interest, is true. So long as an instructor teaches wholly in terms of what he thinks "belongs" to his subject and not in terms of what his students need to know, the waste will go on.

#### ATTENTION TO INDIVIDUAL DIFFERENCES

College students are a selected lot, selected whether by examination, by certification requirement, or by mere graduation from the high school, largely on the basis of a demonstrated capacity to think in abstractions and to work with symbols. But even in abilities based on such capacity our college ratings, as well as the Alpha tests, which have been given thousands, show them to vary enormously. How much they vary in capacity to acquire mechanic skills, how much in capacity to develop abilities in dealing with human beings as persons, we do not know, but the range is certainly great. They come to us with considerable variations in the nature of their schooling, from those brought up through the classics to those brought up through vocational courses of secondary grade. They come to us from greatly varied home experiences, from city homes, from village homes, from farm homes. Many have never earned a dollar, or assumed a responsibility, others have shared in the adult's life sporadically, and others have been and are self-supporting and responsible citizens. There are then, the slow, the normal and the quick; the scholarly, the mechanic, and the sociable; the "city-minded" and the "rural-minded," the experienced of farming and the inexperienced of farming, to mention a few general categories into which it is possible to classify the heterogeneous product of varying heredity and varying environment. Some know exactly whither they are bound, more do not. Here is one of the great problems of college teaching.

For there is no more fundamental postulate to good teaching than the common sense dictum, "You can't talk to a man except in his own language." Education is, as Dr. Dewey puts it, "the reconstruction of experience." There enters upon us an army of young men each<sup>o</sup> possessed of a fund of meanings, a product of his own experience, to which are attached in part symbols of speech. They speak, literally, the same tongue, English. In meanings they speak differing languages. They have, of course, a common denominator of experience, but the fractional basis is small, so that if we attempt to work in the reconstruction of the common fund we are vastly limited. With the individual the discarded resource is large. We attempt to enlarge the common fund by pooling all students in courses prerequisite to further advance in college work, and to a small extent we succeed in that enlargement. Yet much more can be done. In smaller institutions and small classes we can reduce teaching toward the individual basis and have the largest possible field in which to work. In the larger institutions and in large classes we must deal with groups, under present limitations of plan and support. But a segregation of the relatively homogeneous on the basis of capacity and experience is in some measure feasible. As you know, the new president of Swarthmore has proposed a segregation on the basis of capacity of scholarship, which is a hopeful beginning at any rate.

## ACTIVITY WITH SATISFACTION IN LEARNING

Partly, I think, as a result of the necessity for teaching large groups together, partly because of the differentiation of content into "subjects," each of which must be "covered" by the instructor, partly because of academic tradition and the "take it or leave it" attitude imported from German universities, a great deal of our college teaching is of the lecture type, in which the participation of the student is relatively passive. The gathering of data, their evaluation, their organization, is done by the teacher. He does the thinking as well as the talking. The most the student has to do is to show in examination that he followed the thought of the professor, not that he thought himself. Even in our laboratories and in the field, where students are physically active, they are largely engaged in tasks the directions for which are given in manuals, on mimeographed sheets, through dictated notes, or orally. That is, their mental activity is relatively small. The one problem they have is to follow directions, or appear to follow directions, to the satisfaction of the instructor.

Now there is a fundamental law of learning which tends to be violated in both its requirements here. It is to this effect: That modifications in conduct, thought, and feeling are effected only as the learner is active in doing, thinking, or feeling, and as his activity results in, or is accompanied by, satisfaction to him. The degree of modification is closely correlated with the degree of activity, or the degree of satisfaction in the activity, or both. Thus where there is little activity and little satisfaction appropriate to that activity there can be little learning. It behooves us, then, if we would improve our teaching to make the student more active and the appropriate satisfaction of his action greater.

Not all the situations of life call for initiative for problem formulation, for the recognition and weighing of alternatives, and for reasoned action upon the better. The analytical and synthetic processes of reflective thinking are not always called for. Many, probably the majority, of our habits of meeting life's situations, are founded on mere trial and error selections of simple alternatives; many of the tasks that each of us must undertake involve simply the choice between doing what we are told to do, or not doing it, without any reflection on consequences or methods of procedure. But the proportionate demand for reflective thinking, for the solving of recognized problems, is probably higher among college graduates than among any other group of men of like number. Consequently, if we are, in teaching, to approximate the life situations for which we profess to prepare students, the problem method of teaching, is probably of more importance in college teaching than in any other field.

Strictly and accurately no teacher can set a problem for a student; the student must formulate it in the light of a "felt need" of his own. In individual teaching, wherein the instructor is in so close touch and sympathy with the pupil as to be aware of his genuinely felt needs, undoubtedly he can stimulate him to the formulation and solution of a real problem. But with the less intimate touch of group teaching, the knowledge of objective rather than of subjective needs, actual problem teaching is much more difficult, if not altogether impossible. Nevertheless, it is possible to present situations to groups of students in such wise that they are moved to select, evaluate, and organize the data of experience into the

form, at least of problem solution. That is, we can cast our teaching into the problem aspect so that the data which are significant to genuine future problems must be gathered by the student, accepted or rejected as pertinent to the end we have set up for him, and organized to the achievement of that end. In so far we shall have approximated the life problem involving thinking.

In any case, no matter what the form of activity we desire to stimulate, the first standard of McMurry holds. The student must have motive, the impulse to do the thing we wish him to do. If that motive is of the sort that may normally be supposed to move him in the particular job or situation for which we prepare, the stimulation of it is good teaching. If, for example, the prospective buttermaker washes his churn carefully because he wishes to make the standard score in butter, though in life he might do it because he wished to maintain a good price for his butter, yet his work is more appropriately motivated than if he does it because the instructor's eye is upon him. If the prospective chemical investigator weighs his sample to the fraction of a milligram because of appreciation of the significance of the delicate operation, or because of pride in a growing skill, or desire for a perfect neutralization, we have stimulated a more appropriate motive than the desire for three points credit in the semester.

An economic motive is common in vocation. It is often the most appropriate motive for vocational teaching. But we can not, even in cases of poultry husbandry, vegetable gardening, shop work, and the like, by any means always use it in college teaching. Fortunately, there are other interests and satisfactions in the work of the poultryman, the market gardener or in the construction job, that move the man on his own farm to do his work, though college credits and the "cold eye or beaming" of the "Prof." in nowise affect him. Such we should stimulate if it be possible.

I shall not attempt here to go into the details of the problem method, so-called, of which so much has been said and written in recent years. Nor shall I enter further into the recondite and elusive matter of motive. Accepting what he finds and using it appropriately, is about all the teacher can do. But there are three points bearing on the matter which will help to good teaching:

- (1) Seeing that clear objectives of accomplishment through the problem, task, or exercise, are known to the student.
- (2) Choosing, so far as may be, such activities of learning as will give clear and definite results known to the student.
- (3) Measuring and recording the status of the several aspects of skill, and knowledge (and some day perhaps, of attitude) of the students, and keeping him aware of the rate of his improvement in each.

#### SUMMARY

As I see it, then, we have in college teaching, need of these things:

- (1) Clearly defined teaching objectives appropriate to the needs of the particular students with whom we deal as prospective participants in one or another social group.
- (2) Recognition of the limitations of mental discipline.
- (3) Teaching through situations more often approximating those of the prospective life and occupation of the particular students we deal with.



- (4) Closer correlation and integration of courses now isolated.
- (5) Greater attention to individual differences in capacity to learn and in acquired experience.
- (6) Increased activity and increased satisfaction in the learning process on the part of students.

#### SUGGESTIONS

Now what steps can we take toward satisfying those needs? As one whose experience in the field of college administration is not large, I put forward a few suggestions, some based on the experience of colleges, some as merely hypothetical means to solution. None is offered with assurance, but only with hope to stimulate thinking toward some steps that shall be practicable for the improvement of opportunity and service in the agricultural colleges.

(1) The establishment of research studies by men competent in the fields of sociology, economics, and psychology to determine the specific objectives of teaching in the agricultural colleges. To include (a) a study of the demands that the State and the nation make for service on the part of men already graduates of the agricultural colleges, and for types of trained service that may appropriately be developed through the resources of the agricultural college; (b) a study of the specific occupational and life situations which must be met by those entering into such forms of service; (c) a study of the specific attitudes, knowledges, and skills necessary to the meeting of life situations normal to each category of service, for example, what particular abilities are normally demanded of a fruit grower in New York State? of a county agent? of a producer of milk? (d) a study of the actual status of such abilities in groups of students entering from farms, from cities, from classical courses, from vocational courses, etc.; (e) a formulation of objectives in terms of specific standard attainments in the respective groups of abilities for which the college of agriculture must assume responsibility.

(2) Review of such objectives by deans and committees on educational policy, and assignment to appropriate departments within the college, and review by such authorities of all courses formulated by departments: (a) Publicity, conferences, and discussion between departments with respect to content of courses; (b) departmental conferences and review of suggestions with respect to the formulation of courses within departments; (c) interdepartmental and intradepartmental conferences and discussion with reference to problems of teaching methods and the use of extra classroom resources.

(3) A professionally qualified teaching force: (a) Selection of ablest teachers for initial courses in departments, particularly freshman courses; (b) insistence upon professional, as well as technical qualifications, in new appointments to the teaching force; (c) requirement of professional improvement on the part of teachers in service; (d) provision of opportunities for professional improvement—in the distribution of the teaching load of the teacher, in the offering of graduate courses in sociology, economics, and education, in the organization of professionally conducted seminars in college teaching problems.

(4) Provision for vocational and educational guidance of beginning students: (a) By courses dealing with the opportunities and the demands

for particular qualifications in those forms of life service to which graduates are called; (b) tests of ability and indicated capacity on the part of students for meeting requirements in fields of choice indicated by them; (c) student advisors whose duties shall extend beyond the filling of a schedule necessary to acquirement of the semester's required credits.

(5) Groupings of students for purposes of teaching in the light of (a) previous out of school experience; (b) school and college records; (c) tested intelligence.

(6) Rating of the improvement of students in separate categories or aspects as, for example, abstract intelligence, mechanic intelligence, social intelligence, by (a) adoption of scales of improvement in particular abilities; (b) use of specific practical tests for narrow skills; (c) use of problem examination within a field, calling for resourcefulness in factual knowledge and organization through reflective thinking, for the testing of attitudes and technological abilities.

(7) Employment of an advisory consultant to the teaching force, who shall be (a) possessed of broad and thorough professional training; (b) an experienced and successful teacher in some field of technology and art included in the curriculum of the agricultural college; (c) tactful, patient, constructive in his attitude toward teaching problems.

C. F. Curtiss, Iowa State College, traced the growth of sentiment in favor of professional training for college teachers and urged that college departments of pedagogy give some attention to problems of teaching within the institutions. At Iowa, many of the younger and some of the older teachers have taken a special course on teacher-training conducted by the department of pedagogy.

Carl R. Woodward, New Jersey State College of Agriculture, presented the following paper:

#### SOME BASIC PRINCIPLES UNDERLYING THE CURRICULUM OF THE COLLEGE OF AGRICULTURE

BY CARL R. WOODWARD

##### INTRODUCTION

A study of the curricula of the State colleges of agriculture in this country for the past two decades reveals a wide variation in content among the different colleges, as well as marked changes from time to time within the individual colleges. That such variation and changes have occurred is not strange, in the light of circumstances that have marked the modern development of the agricultural industry.

Our fund of agricultural information has been added to, largely through the investigations of the agricultural experiment stations. Changes in farm practice have resulted from such discoveries, and agricultural methods have been altered with the improvement of the various types of farm machinery. The complexion of rural life has been transformed with the advent of the telephone and the automobile. The relations of agriculture to other industries have become more involved and intricate, and the interdependence between country and city more inevitably established.

Coincident with this progress of the industry, we have witnessed a remarkable growth of our colleges of agriculture. To quote the former Commissioner of Education, Dr. P. P. Claxton: "Within the last 15 years their growth has been phenomenal in extent, variety, and definiteness. There is, I believe, nothing else in the college world to equal it."

Through this period, the curriculum of the college of agriculture virtually has been passing through a period of evolution, and it would not be exaggerating to say that it is not yet entirely through the experimental stage. It is true in general, also, that the present-day curriculum of the college of agriculture is an outgrowth of the old academic college course, resulting from a grafting of agricultural education on the old stock. We have been feeling our way along, dropping a course here and adding another there, in an effort to adjust the courses of study to new developments; and in many cases, at any rate, have not been guided by definite, clear-cut principles upon the basis of which we could safely reorganize the curriculum.

It might be well to stop at this stage and survey the situation, in an effort to crystallize present-day tendencies and determine the factors which should be considered in constructing or reconstructing a curriculum. It was with this aim that a study was undertaken at the New Jersey State College of Agriculture, covering an analysis of the curricula of the colleges of agriculture in the United State. More than a year was consumed in the study, and it was completed a little over two years ago. The study was intended to throw some light upon the following questions:

- (1) What subjects should be required of all students in the four-year course in agriculture?
- (2) What place should each of these occupy in the course?
- (3) What should be the proportion of time devoted to the different types of work in the course?
- (4) How much freedom of choice of subjects should be allowed?
- (5) What is the best method of providing for specialization?
- (6) What relation should farm practice have to the requirements for graduation?
- (7) What are the weakest features at present in the average four-year course?
- (8) How may the efficiency of a course be measured?
- (9) How and to what extent may these principles be applied in the reorganization of a curriculum in agriculture?

A valuable contribution had been made to the subject by Dr. C. D. Jarvis in U. S. Bureau of Education Bulletin 29 (1918), but most phases of our study were undertaken from a different point of view, and hence there was little overlapping.

The first part of the investigation consisted of a compilation of data from the catalogs of the forty-eight State colleges of agriculture. Announcements for the college year 1917-18 were used in most cases. This was followed by a questionnaire to the deans of the colleges in the spring of 1919.<sup>1</sup> This paper is intended, first, to present briefly the most outstanding results of the study and, second, to discuss a practical basis for the reorganization of the curriculum. It should be borne in mind that the

<sup>1</sup>The complete results of the study appear in U. S. Bureau of Education Bulletin 40 (1920).

data presented are not thoroughly up-to-date, and that some changes may have occurred since the study was undertaken.

#### ANALYSIS OF CURRICULA

*What Courses Should be Required and When?*—The first step was to determine the subject that, according to most common practice, occupied the most important place in the four-year curriculum. This was done by tabulating the number of colleges requiring each course, and also by determining their "relative importance" on the basis of the number of hours and the number of semesters devoted to each, for which purpose a specially designed unit of measure, which we called a "weight," was used.

The relative rank of subjects required in 25 or more colleges, according to the number of colleges, is as follows:

- |                         |                            |
|-------------------------|----------------------------|
| 1. English.             | 9. Dairy husbandry.        |
| 2. Inorganic chemistry. | 10. Organic chemistry.     |
| 3. Military training.   | 11. Bacteriology.          |
| 4. Botany.              | 12. Qualitative chemistry. |
| 5. Animal industry.     | 13. Trigonometry.          |
| 6. Zoology.             |                            |
| 7. Physics.             |                            |
| 8. Soils.               |                            |

The relative rank by weights corresponds closely, as shown below:

- |                         |                        |
|-------------------------|------------------------|
| 1. English              | 8. Soils.              |
| 2. Inorganic chemistry. | 9. Field crops.        |
| 3. Military training.   | 10. Modern language.   |
| 4. Botany.              | 11. Bacteriology.      |
| 5. Animal industry.     | 12. Organic chemistry. |
| 6. Physics              | 13. Dairy husbandry.   |
| 7. Zoology.             |                        |

Of these subjects, English, inorganic chemistry, military science, botany, trigonometry and animal industry are most commonly given in the freshman year; physics, organic chemistry, zoology, soils and dairy husbandry in the sophomore year; bacteriology in the junior year; and qualitative analysis appeared in an equal number of colleges in the freshman and sophomore years.

As to the time devoted to each, military science appears most commonly as a one-hour-a-week, two-semester subject; qualitative analysis equally as a two-hour and three-hour, one-semester subject; trigonometry, organic chemistry, bacteriology, soils, animal industry, and dairy husbandry as three-hour, one-semester subjects; English, physics, zoology, and botany as three-hour, two-semester subjects; and inorganic chemistry as a four-hour, two-semester subject.

*What Proportion of Time Should be Devoted to Each Type of Work?*—It is generally accepted that the four-year course should not be confined narrowly to any one type of work, but that it should include a certain amount of the different types of subject-matter in order to give the student a well-rounded training. While the aim of the course is to prepare for the profession of agriculture, it must not be limited to agricultural subjects alone. The reasons for this are obvious. Many agricultural subjects

are dependent upon pre-requisite courses of the fundamental type, such as chemistry or botany. The aim of a college course leading to a bachelor's degree is more than vocational; it should train for the highest type of citizenship. For this reason the liberal, or academic, studies have an important and essential place. But granted that the student should pursue some work of these different types, what is the proper proportion of each?

Another factor in balancing the curriculum is that of the proportion of work to be required. How much should be required, how much offered as prescribed electives, and how much as free electives?

For the purpose of studying this phase of the problem, the courses were classified in the following types: (1) Academic, (2) scientific, (3) general agriculture, (4) special agriculture, and (5) elective. Another classification used was (1) required, (2) prescribed elective and (3) free elective. The balance of curriculum for each college, for each of the four years and also the average for the entire course, was determined on a percentage basis for both classifications.

The average balance for the 48 colleges, considering the entire four-year course, was found to be as follows:

	Percent
Academic .....	22.0
Scientific .....	24.5
General agriculture .....	26.4
Special agriculture .....	12.5
Total agriculture .....	38.9
Free elective .....	14.6
<hr/>	
Total .....	100.0

There is a great variation within each type among the different colleges.

An average of the 29 replies to the questionnaire designated as the most desirable balance, a reduction of 4.3 percent in academic work, 0.6 percent in general agriculture, and 2 percent in free elective, and a corresponding increase of 2.7 percent in scientific and 4.2 percent in special agriculture. Also, it was recommended that required work be increased by 4.7 percent; the prescribed elective being reduced 4.5 percent and the free elective to 0.2 percent.

Some interesting sidelights were thrown upon the balance of the curriculum as the study progressed. The colleges were grouped according to geographical location, and also according to size, and averages determined, to see if these factors influenced the balance.

The most striking influence of geographical location on the curriculum seems to be a decrease in the proportion of academic work and of required work, and a corresponding increase in the freedom of choice, as the location of the college changes from the eastern toward the western part of the country. The New England and southern groups are relatively low in the proportion of total agriculture, but the proportions for the other five groups are remarkably close, all being within a few units of 40 percent.

Summarizing the influence of size upon balance of curriculum, the available data indicate that (1) the medium-sized college requires the largest proportion of academic work, with the largest and smallest colleges requiring the least; (2) size has little influence on the proportion of scien-

tific work; (3) the smallest colleges require the most general agriculture and the largest offer the greatest degree of specialization; (4) the proportion of total agriculture is highest in the largest colleges, and nearly as high in the group of smallest institutions; and (5) the proportion of required work varies inversely and elective directly with the size of the college.

*Specialization, How and When?*—The most common method of providing specialization, as revealed by the study, is the departmental group system, beginning with the junior year. That is, at the end of the second year the students elect a definitely prescribed group of subjects composed in a large measure of specialized courses offered within the respective departments. It was found that 24 of the 48 colleges provided specialization through the departmental group system. In contrast with this method, 13 colleges had the major-minor option system, and 11 the free elective system. Thirty-seven began specialization in the junior year, 6 in the senior year and but 5 in the sophomore year.

These tendencies were further emphasized by the questionnaire replies. Twenty voted for the departmental group system, 8 for the major-minor option, and 9 for the free elective; 27 for beginning specialization in the junior year, 3 in the senior year, and 2 in the sophomore year.

There appears to be little relation of the factor of geographical location to specialization. Also the size of the college appears not to influence the time of beginning specialization. Colleges of less than 500 students, however, most commonly provided specialization by the departmental group system, while institutions of more than this number apparently favored the major-minor option system.

*Should Practical Experience be Required?*—Practical experience was found to be a requirement in a majority of the colleges—25 with and 23 without. As to the time when this requirement should be fulfilled, in 11 colleges any time before graduation was acceptable, while 6 required it before the fourth year, and 4 before the third year. In 3 cases it must be under the supervision of the college, and in 9 on an approved or accredited farm. In 4 cases academic credit is allowed.

The questionnaire study confirmed these tendencies, favoring the requirement of farm practice, 6 months being the most popular, at any time before graduation. The need of placing the practice under the supervision of the college was emphasized, the vote being almost 2 to 1 for it. There seemed to be practically unanimity of opinion that farm practice should be required, as we received only one dissenting vote.

Geographical location appears to have a very significant relation to farm practice in the curriculum. The New England and Middle Atlantic States lead in the farm practice requirements; there is a decided tendency to omit the requirement in the Southern States, while in all other groups about as many omit the requirement as include it. Apparently this is due to conditions peculiar to the different sections. In the New England and Middle Atlantic States a larger proportion of city-bred boys are enrolled in the colleges of agriculture, who have had no practical farm experience previous to matriculation. In the Central and Western States a much larger proportion of the students come from farms, and familiarity with farm practices is more general. In the Southern States the prevalence of negro labor affects the situation.

Also, it was found that a greater proportion of small colleges require farm practice than of the larger ones, the most marked tendency being in the group of less than 100 students. With 100 to 500 students only about two-fifths of the colleges make this requirement. Above this number practice is required by just one-half of the colleges.

#### BASIS FOR REORGANIZING THE CURRICULUM

With these facts as a background, the problem of reorganizing the curriculum may be approached. Before proceeding, however, it may be well to consider two questions: First, what should we expect of a college graduate? In other words, for what kind of a position should the four-year course in agriculture be designed to fit the student? Bearing on this point, the following question was included in the questionnaire: "Which of a given list of enterprises should the graduate of the four-year course in agriculture be expected to conduct successfully without other training and experience than that required for graduation?" This is how the answers appeared when summarized:

- (1) Superintendent of large farming enterprise, 2.
- (2) Operator of farm, 17.
- (3) County agricultural agent, 4.
- (4) Extension specialist, 3.
- (5) Have sole charge of some special branch of farming, 18.
- (6) Assistant farm superintendent, 23.
- (7) Assistant county agent, 25.
- (8) Assistant extension specialist, 22.
- (9) Commercial work related to agriculture, 23.

It appears to be quite generally accepted that the college graduate should begin in a subordinate place; for example, as an assistant in some agricultural endeavor, and here gain the necessary experience which would enable him shortly to assume a more responsible position. As expressed by the dean of one of the northeastern colleges, the graduate needs a year's experience for "hardening off."

The second question we should ask at this point is: What are the weakest spots in the training received today by the average college man? It is only natural that the agricultural college, in its rapid growth of recent years and in its effort to meet new conditions that have arisen, should not succeed in all cases in furnishing a training of high grade in all respects. The replies to this question in the questionnaire, may be summarized as follows:

- (1) Deficient in academic training, 18.
- (2) Deficient in scientific training, 16.
- (3) Incomplete training in general agriculture, 7.
- (4) Failure to allow sufficient specialization, 9.
- (5) Inadequate requirements in experience, 18.
- (6) Failure to develop sense of moral responsibility to profession, 14.
- (7) Faulty instruction, 3.

Inadequate academic and scientific training, lack of experience, and failure to develop a feeling of moral responsibility to the profession appear to be the chief points of weakness. The last mentioned has been so keenly felt in one institution that a course in agricultural relationships has been introduced to meet the need.

There would probably have been more to designate faulty teaching as one of the chief reasons if this had been included in the check list in the questionnaire, as this was brought out many times in the general comment on the questions. In fact, this point of weakness is probably more generally recognized than any other. Various reasons were given: Inadequate training of instructors, insufficient time available to the instructor for preparing work and for study in keeping abreast with agricultural development, use of old and out-of-date text-books, poor methods, inefficient use of time, especially in laboratory work. It was brought out that the sciences should be taught from the agricultural viewpoint, not by instructors who know nothing of and have no sympathy with agriculture. Another condition emphasized was the failure to apply the technical training, to tie up theory with practice, to bring classroom and field together. This undoubtedly is the chief reason for the almost unanimous recommendation that farm practice be required.

Both the cultural and the vocational aim, then, should receive consideration in reorganizing a curriculum. Also the previous preparation of the student, or in other words, the college entrance requirements, would affect its content. In view of the study described above, together with the opinions of the deans as expressed in the questionnaire, and more recent observations, we would summarize the fundamental principles underlying the curriculum, as applying to average conditions, as follows:

(1) A normal credit requirement would be 20 credit hours a semester, or a total of 160 for graduation.

(2) The distribution of types of work should be about as follows: Academic, 21 percent; scientific, 27 percent; general agriculture, 26 percent; special agriculture, 14 percent; total agriculture, 40 percent; elective, 12 percent.

(3) The proportion of required work should be about as follows: Required, 62 percent; prescribed elective, 26 percent; free elective, 12 percent.

(4) The work of the first year should be predominantly of the academic and scientific types, forming a foundation for the advanced work in agriculture to follow.

(5) Some academic work should be given each year in order to fulfill the cultural aim, and in order to develop a broad point of view within the student as he progresses toward the completion of his course.

(6) Some work in agriculture should be given in the first year, in order to give the student the agricultural viewpoint as soon as possible, and should follow in increasing proportions throughout the four years.

(7) All work in the first year should be required. Some election may be allowed in the second year, but most election should be left until the third and fourth years.

(8) During the first and second years, courses covering the fundamental principles of agricultural science should be required in order to form a basis for the technical training to follow.

(9) Elementary courses in the main branches of agriculture should be required in the first two years in order to form a foundation for specialized study and to give the student a wide outlook on the field of agriculture and an unprejudiced view of its different phases, so that he may make his choice of special work intelligently.



(10) Specialization should commence at the beginning of third year.

(11) The best method of offering specialization is the departmental group, in which a student elects his special work by choosing a definitely outlined course of studies arranged to fit for the field in question with an allowance for a small amount of free election.

(12) A minimum of six months of farm practice, completed before the fourth year, preferably before the third year, and better still before matriculation, should be required.

(13) Certain subjects should be required in all curricula; others are desirable and in most cases should be included, but because of local conditions may be left out. These are indicated, respectively as Groups A and B.

#### Group A

##### *First year:*

English.  
Physical or military training.  
General chemistry.  
Botany.  
Types and breeds of farm animals.

##### *Second year:*

Public speaking.  
Zoology.  
Qualitative chemistry.  
Organic chemistry.  
Soils and soil management.  
Farm machinery.  
Dairy production.  
Poultry husbandry.  
Fields crops.  
Fruit growing.

##### *Third year:*

Bacteriology.  
Entomology.  
Economics.

##### *Fourth year:*

Farm management.  
Rural economics.

#### Group B

##### *First year:*

Algebra.  
Trigonometry.  
Farm shop.

##### *Second year:*

Physics.  
Vegetable gardening.

##### *Third year:*

History.  
Feeds and feeding.  
Soil fertility.

##### *Fourth year:*

Rural sociology.

(14) Foreign language should be required only of students who have not had at least two years in preparatory school and of those who are preparing for teaching or research.

(15) The curriculum should be shaped to meet local conditions in the State and at the college.

This summary is given as epitomizing the data surveyed, and should be interpreted as such. It is fully appreciated that local conditions are usually the determining factor in formulating a curriculum, and that the differences of conditions governing different institutions make it impossible to apply any one hard and fast rule to all colleges alike. These principles,

therefore, should be interpreted liberally, and should be considered as being of broad rather than specific application.

With the exception of the last, the above-named factors are more or less definite quantities. The last adaptation to local conditions, is, however, the variable factor. It is the element of elasticity, essential in any attempted standard for curricula designed for general application. It involves a goodly number of considerations, of which, perhaps, the following are the most important:

(1) *The agricultural practices of the State.* This is self-evident and needs no elaboration.

(2) *The agricultural needs of the State.* This factor should be considered in its broadest sense. It involves, first, a recognition of any weak features of the State's agriculture, as well as the agricultural resources and latent possibilities of the State and the lines of development. The college should aim, to train its students for this leadership.

(3) *The educational system of the State.* Articulation with the secondary schools, of course, is necessary. Another point of contact is in the training of teachers and extension workers.

(4) *The nature of the student clientele.* The needs of the student, as determined by his previous training, farm experience, capacity, and aims, are varying factors, and certain tendencies predominate in particular States. These are of sufficient importance to be a determining factor in formulating a curriculum.

(5) *The resources and facilities available for instruction purposes,* including such items as funds, faculty, and materials and equipment in field and in laboratory. The curriculum is often limited by a shortage or lack of any one of these.

(6) *The organization of the college,* especially in relation to other divisions of higher education. For instance, the curriculum problem in the small college differs from that of the large university, where such questions as the offering of courses in other colleges (e. g., the college of liberal arts) must be considered.

#### CONCLUSION

We would not venture to claim that the comparison of these factors as standards with any given curriculum would give a true index of its efficiency. The ultimate test of a curriculum is the quality of the product, the ability of the student graduated. And right here the intangible personal factor, of student, and instructor as well, plays its inevitable part. It seems reasonable, however, that by clarifying the aims of the four-year course, and by agreeing upon definite working principles about which the subject-matter should be arranged, we shall be in a position so to shape the curriculum that the colleges of agriculture shall turn out their graduates better prepared for the work that awaits them.

In a further discussion of the same subject, J. F. Duggar, Alabama Polytechnic Institute, presented the following paper:

## THE CURRICULUM OF THE COLLEGE OF AGRICULTURE

BY J. F. DUGGAR

Probably no curriculum intended to fit man for any pursuit in life has changed more within the past quarter century than that of the college of agriculture. The ends to be attained in working out this curriculum in any institution, or set of institutions, are various. The complexity is increasing, for probably no other technical curriculum is expected to serve the needs of men engaging in as wide a range of activity and life work.

For what pursuits is the agricultural curriculum to prepare its graduates? We must certainly never cease to have in mind the needs of the agricultural graduate who will engage in ordinary farming, either for himself or as the employed agent of another. A class equally as large and with needs even more divergent is the army of agricultural graduates who enter the service of agricultural and technical institutions. Among these the greater number are engaged in some line of agricultural public service, especially in agricultural extension, investigation, and teaching, either in colleges or vocational schools.

What is the fundamental need of all of these classes of men? I think we can all agree, whatever our special interest, that the one requirement of all classes of students is that each graduate shall be equipped by his college course with what we may call a general education, and imbued with at least a fair degree of culture. Any college course which does not secure this end is, in my opinion, a failure, no matter how generous be its provision for the acquisition of technical information.

What studies shall be the chief instruments in bringing about this general education and culture? The list is a long one. In fact it is almost all-inclusive, and it becomes longer in proportion as the quality of teaching of each subject is the best; but in general I think we may name a few subjects as being, under ordinary conditions, most fundamental in the acquirement of the desired general education and culture. Among these subjects, I should give first place in the agricultural curriculum to English, and I am doubtful whether even those students who prefer modern languages should be excused from English before they have been long enough in that department to give conclusive proof of their ability to write correct, concise English, to appreciate good literature, and even to spell correctly.

Certainly mathematics is less essential in the agricultural curriculum for professional use than in many engineering and certain other courses in land-grant colleges. Indeed, may I be permitted to suggest that one method of making room for the great variety of subjects almost essential in a well-rounded agricultural education, may well consist in abbreviating any course in college algebra. This will only be possible where the agricultural students are taught mathematics in sections separate from the students in engineering, a separation that I think important in all subjects involving pure or applied mathematics.

I am inclined to the belief that economics should be required of all agricultural students for its broadening of the student's horizon of thought and sympathy. Moreover, in this age when so many unsound views of government are propounded, is it not a part of the function of institutions supported by the State and Nation to teach sound views of economics,

since these are fundamental to sound legislation? Indeed is it overstraining the point to look on training in economics as just as much a part of national defense as training in military science?

Among the natural sciences all may be so taught as to minister to general education and culture. In this respect I should give first places to physics and chemistry.

I believe that agricultural students are much more appreciative of physics when separate courses in this subject are offered to agricultural and other non-engineering students. In this way physics can be taught with less of mathematics than is generally the case.

I need say nothing as to the importance of chemistry. It is the foundation on which the agricultural sciences are largely based and in addition it has the advantage over some of the biological sciences in greater definiteness of results. Almost equal emphasis may well be given, from the standpoint of general education, to botany, especially to the more general courses in this subject. I voice what I believe to be the reasonable desires of agricultural students, and especially of those who may later sit as pupils at the feet of agricultural graduates, in saying that in the teaching of the first courses in botany more attention should be given to the flowering plants and to visible nature, even though this should somewhat reduce the amount of time devoted to studies of the lower orders of plant life.

Of course, it must be fully realized that the amount of chemistry or botany needed by a particular student having in mind his life work must vary widely, and the largest options must be given after the first few courses in these subjects.

Zoology and entomology have their places even in basic courses, but require less time than either chemistry or botany.

I pass briefly the subject of languages, though one might dwell here at length. In my opinion, students who have any expectation of teaching or engaging in scientific work of any kind, should be encouraged to study French and German. There should be no prejudice against studying German, which unlocks so much of the literature of many sciences.

Coming now to the applied subjects—the subjects for the teaching of which, in popular estimation, the colleges of agriculture are supposed to exist. These are agronomy, horticulture, and animal husbandry, with which, as a recent addition, must be listed agricultural engineering.

The subject matter in agronomy must include both courses in soils and in crops. The tendency now is away from the stress formerly laid on soil physics and increasingly toward soil fertility or the chemical phases of the subject. Here it seems in place to add a personal conviction that the evolution of excellent courses in soil fertility makes unnecessary the lecture courses formerly given in departments of chemistry under the title of agricultural chemistry, though, of course, soil fertility courses do not in the least take the place of laboratory courses in what may be called agricultural chemistry.

In the teaching of forage crops there is need that the botanist and agronomist should not overlap. The borderland should be clearly delimited by consultations between teachers of these two subjects. Certainly we need more of the botany of crop plants, including the grasses, but such courses should not deal with the culture of these plants.

In mapping out courses in horticulture there is the same need that has just been intimated for consultation and allocation of territory between teachers of horticulture and agronomy. I see no reason why instruction in soils should be repeated as a part of horticulture for students who have had it as a part of agronomy, though, of course, there are horticultural applications which should be developed, such as the making of artificial soils for greenhouse work, the biological, physical, and chemical effects of soil sterilization, etc. Certainly a curriculum in horticulture will be concerned largely with propagation and the underlying plant physiology, and with the adaptations of horticultural plants.

The field of spraying practice, while claimed in part by the departments of entomology and pathology, belongs chiefly, I think, as a teaching subject, to horticulture, where it is an essential part of good orchard practice. By this I do not mean that investigations in the use of sprays should be confined to this department, for in these the entomologist, pathologist, and sometimes the chemist have equal interest.

My observation is that there is room to place additional emphasis on the culture of vegetables and other herbaceous plants rather than to center it too exclusively on fruits, which, however, are doubtless entitled to first place.

In animal husbandry we can scarcely place too much emphasis on nutrition. The most debatable subject here is the amount of time that should be given to the judging of livestock. Certainly judging should be encouraged as a means of training the habit of observation and, from the professional standpoint, as a means of approximating the relative values of individual animals for production or breeding. The question may well be raised, however, whether the judging of livestock, especially of dairy cattle, has yet been reduced to such a scientific basis that we may have much confidence in the judge's conclusions, or much justification in encouraging the student to neglect for it any of the fundamental subjects.

It must come as a shock to many who have assumed that methods of judging are infallible, to learn the recent results secured at the Maine Experiment Station. The biologist of that station compared the average judgment of nineteen expert judges of dairy cattle with the records made by the cows judged. Their average judgment was only about 50 percent correct. More striking still was this fact: The average weight, or score, given by these nineteen judges to the udder alone afforded just as accurate an indication of the cow's productive value as did their judgment based upon the entire animal. That is, the dairy cows judged might just as well have been covered with blankets and these lifted only sufficiently for the judges to view their udders, for them to reach judgments just as accurate as by carefully considering every feature of the entire animal.

In this connection let us not forget that in agronomy there was once a fad for judging, especially for corn judging, and that the amount of time now given to this subject is apparently less than formerly. This is fortunate, too, for the investigations of the Ohio Experiment Station and of many plant breeders have indicated that the ears of corn which make the highest scores are not those that afford the largest yields. My opinion is that there is need, even from the teacher's standpoint, for a continuation of the investigations on the relation of various qualities of the ear to productivity. I refer to studies of such points as those embraced in a recent

bulletin of the Missouri Experiment Station and in the 15 years of work in corn breeding by the Alabama Experiment Station. Unfortunately, the unpublished records of the Alabama work were destroyed in the burning of the agricultural building a year ago. There is even a greater need for subjecting to the test of measurements, figures, and biometric calculations the score card for animals, especially for dairy cattle. Then we shall know how reliable or misleading are present standards and how much time the student may wisely give to the study and application of present or new score cards or other standards for judging livestock.

The paper just read by Professor Woodward is deserving of careful study in connection with any contemplated changes in the course of study. He has brought the material together in most convenient form, and as I listened to the reading of his paper it seemed to me that his conclusions were sound and helpful.

E. J. Kyle, Texas Agricultural and Mechanical College, called attention to the difficulties encountered in revising curricula, due to the increasing number of subjects that it is desirable for students to take. He expressed the belief that botany and inorganic chemistry should be turned over to the high schools. He also urged the importance of greater attention to economic studies in agriculture, beginning as early as the sophomore year and continuing throughout the junior and senior years.

Several urged the importance of English in the agricultural curriculum and K. C. Davis of the George Peabody School for Teachers, Nashville, Tenn., dwelt upon the importance and value of applied English, similar in character to courses in agricultural journalism.

C. F. Curtiss, Iowa State College, stated that we must begin to study the needs of various groups of students and form courses that will allow specialization throughout the four years of college work.

#### PROPOSED NEW SUB-SECTION OF THE SECTION OF AGRICULTURE

A resolution from the Association for the Advancement of Teaching, proposing a new sub-section (agricultural education) of the Section of Agriculture, was approved and referred to the Executive Committee but was afterwards withdrawn. (See p. 353.)

#### ELECTION OF OFFICERS

On motion, the following officers were nominated for the Sub-section of Resident Teaching for the ensuing year: Chairman, Alfred Atkinson, Montana State College; secretary, H. L. Kent, New Mexico College of Agriculture and Mechanic Arts.

TUESDAY AFTERNOON, NOVEMBER 8, 1921

This was a joint session of the three sub-sections of the Section of Agriculture, dealing with matters pertaining to resident teaching.

The following paper was presented by Leon M. Estabrook, United States Department of Agriculture:

## THE INTERNATIONAL INSTITUTE OF AGRICULTURE AT ROME

BY LEON M. ESTABROOK

I feel some hesitation in addressing this gathering of scientists and educators on the organization and function of the International Institute of Agriculture at Rome, Italy, but because of my relation to the institute through the crop and live stock reporting service of the Bureau of Markets and Crop Estimates and my experience as a temporary delegate to the last general assembly meeting of the institute in November, 1930, I may be able to contribute something of interest to the knowledge you already have of this subject.

The International Institute of Agriculture at Rome is an international clearing house for statistical and other information relating to the agriculture of all countries of the world. The two men most active in founding the institute were David Lubin of California and King Victor Emmanuel III of Italy.

It is related that early in the present century David Lubin started out to find who fixed the price of his wheat. He visited in succession the grain exchanges of the Pacific Coast, Kansas City, St. Louis, Minneapolis, Duluth, Chicago, and New York, where he was told that the wheat quotations in the markets of this country were the Liverpool quotations less cost of transportation to Liverpool. He went to Liverpool to investigate and there he was told that the price of wheat was the result of free competition between buyers and sellers on the floor of the grain exchange, and that a relatively few men were so engaged; that buyers and sellers based their prices upon relative supply and demand throughout the world; that in order to determine the relative supply and demand they made use of official and unofficial sources of information, that is, government reports, private estimates, statistics of imports and exports, and trade rumors, all of which were more or less fragmentary, incomplete, and unsatisfactory. Lubin conceived the idea that if the distribution and price of the world's greatest bread grain in which humanity is so vitally interested depends upon the relative supply and demand, then the governments of the world should systematically collect and publish dependable data on production, supply, movement, exports, imports, consumption, surpluses, deficits, transportation rates, and prices, and that somewhere in the world there ought to be an international organization to which the government reports might come and where they could be summarized in world balance sheets and reported back to all countries. Lubin failed to get support for his scheme of international crop reports in the United States, in Great Britain, and in France, but finally succeeded in winning the support of King Victor Emmanuel III of Italy, who agreed to take the initiative. The king was as good as his word. A convention of delegates from the principal countries met in Rome and on June 7, 1905, signed a draft of a treaty establishing the International Institute of Agriculture, which treaty was subsequently ratified by about sixty governments which contributed funds to its support. Dr. A. F. Woods, President of the University of Maryland, represented the U. S. Department of Agriculture at the convention which drafted the treaty in 1905. The treaty was ratified by the United States in 1906 and was promulgated in January, 1908.

The King of Italy not only erected a beautiful building for the accommodation of the institute, but set aside an endowment from his private fortune greater than the contribution from any government.

#### OBJECTS

The objects sought to be accomplished by the International Institute of Agriculture are set forth in article 9 of the treaty. They are:

(1) To collect, study, and publish as promptly as possible statistical, technical, or economic information concerning farming, plant and animal products, the commerce in agricultural products, and the prices prevailing in the various markets.

(2) To communicate to parties interested, also as promptly as possible, the information collected under the first clause.

(3) To make known the new diseases of plants and animals and insect pests which may appear in any part of the world, showing the territories affected, the progress of the maladies, and, if possible, the remedies which are effective.

(4) To study questions concerning agricultural cooperation, insurance, and credit in all their aspects; to collect and publish information which might be useful in the various countries for the organization of forces connected with agricultural cooperation, insurance, and credit.

(5) To submit for the approval of the adhering governments, when necessary, measures for the protection of the common interests of farmers and for improving their conditions, after having utilized all necessary sources of information, such as the recommendations of international or other agricultural congresses, or congresses of sciences applied to agriculture, or agricultural academies, learned bodies, etc.

The treaty specifically provides that the institute shall have no jurisdiction over any matter affecting the economic interests, the legislation, or the administration of any particular State.

#### FUNDS AND VOTING POWER

Adhering governments are grouped into five classes according to the amount of money they elect to contribute annually to the support of the institute, which in turn determines the number of votes to which each is entitled:

The first group comprises governments which contribute \$8,000 and have five votes.

The second group comprises governments which contribute \$4,000 and have four votes.

The third group comprises governments which contribute \$2,000 and have three votes.

The fourth group comprises governments which contribute \$1,000 and have two votes.

The fifth group comprises governments which contribute \$500 and have one vote.

In 1914 there were fifty-five adhering governments, of which sixteen were in the first group, including the United States, three in the second, three in the third, fifteen in the fourth, and eighteen in the fifth. Since then the number of adhering governments has increased to fifty-nine. In 1914 the revenue of the institute was estimated at 1,172,000 francs, or approximately \$235,000, and a reserve fund had accumulated amounting



to about \$100,000. In 1920 the revenue was estimated at 1,400,000 francs, or Italian lire, which on the basis of then existing rates of exchange was equivalent to about \$70,000, or less than one-third the prewar income measured in gold dollars. However, this depreciation in the gold value of the income of the institute was not so serious as it would seem because all the expenses of the institute, including salaries, continued to be paid on the prewar basis of Italian lire.

#### ORGANIZATION

The treaty provides for two governing bodies, a general assembly and a permanent committee.

*General Assembly.*—The general assembly is the supreme authority. It examines the proposals of the adhering governments and the requests to be made upon them. It passes the accounts and apportions the funds for the various projects. It reviews the work of the permanent committee and of the institute. It formulates the programs of work to be done. It is made up of delegates designated by each of the adhering countries and meets approximately every two years. Each government may be represented by several delegates, but the number of votes accredited to a particular government depends upon its contribution to the funds of the institute and not upon the size of its delegation to the general assembly. Five meetings of the general assembly have been held at Rome, at which the Department of Agriculture was represented as follows:

November, 1908, C. C. Clark, now Assistant Chief, U. S. Weather Bureau.

December, 1909, George K. Holmes, now Statistical Scientist, Bureau of Markets and Crop Estimates.

May, 1911, Victor H. Olmsted, then Chief of the Bureau of Statistics.

May, 1913, A. C. True, now Director of the States Relations Service.

November, 1920, Leon M. Estabrook, now Associate Chief, Bureau of Markets and Crop Estimates.

At each of these meetings the United States was represented by other delegates, but not from the Department of Agriculture. For instance, at the meeting in November, 1920, Thomas F. Hunt of California and Harvey J. Sconce of Illinois were delegates. The countries of Western Europe were represented by large delegations which greatly outnumber the delegation from the United States.

*Permanent Committee.*—The executive authority is vested in the permanent committee. The permanent committee prepares the new proposals for the consideration of the general assembly, carries out the program prescribed by the general assembly, elects the president, vice-president, and general secretary; authorizes the appointment, salaries, promotions and separations from service of employees; and generally performs the duties of a board of directors. The permanent committee is made up of one delegate from each of the adhering countries who resides in Rome. The members of the permanent committee have office rooms assigned to them in the institute building. They meet at least once a month, except during the summer from July to September.

David Lubin served as the permanent delegate of the United States from the organization of the institute until his death in January, 1919.

The position remained vacant until the appointment of Dean Hunt in November, 1920. Dean Hunt resigned in May, 1921, and was succeeded by Dr. Wm. H. Stevenson of the Iowa State College of Agriculture, who is our present delegate and member of the permanent committee.

**Bureaus.**—For carrying out the purposes of the treaty under the direction of the general assembly and the permanent committee the International Institute is organized into four principal bureaus, administrative, statistical, agricultural intelligence and plant diseases, and economic and social intelligence.

The Administrative Bureau is in charge of the general secretary and takes care of routine administrative matters, such as personnel, accounts, files, correspondence, library, publications, etc.

The Bureau of Statistics has charge of sending out the necessary blanks for obtaining crop and livestock reports, imports and exports, stocks on hand, transportation rates, market prices, and similar information, and the compilation and preparation of the international statistical reports.

The Bureau of Agricultural Intelligence and Plant Diseases has jurisdiction over the activities of the institute with respect to technical agriculture, plant diseases, and insect pests.

The Bureau of Economic and Social Intelligence has jurisdiction over the activities of the institute with respect to agricultural economics, co-operation, agricultural credits and insurance, agricultural labor and wages, and social conditions of farm life.

Altogether the institute has slightly more than 100 employees, some of them highly educated and very earnest and efficient in their work. In 1920 their salaries were pitifully inadequate and had to be supplemented by outside employment. For instance, redacteurs, college-bred men who serve as editors, translators, and summarize data for publication, were paid only 22 lire per day, which in 1920 amounted to about 84 cents a day, or between \$25 and \$30 per month as their official salary. Other employees were paid in proportion.

#### WORK OF THE INSTITUTE

The International Institute of Agriculture is essentially an international clearing house for information collected and furnished to it by the adhering governments. The institute operates only through adhering governments by means of suggestions, official requests, and questionnaires. It can use only the official information supplied by the adhering governments. It can use information from unofficial sources only with the approval of the government of the country from which the information is obtained. The four bureaus into which the institute is divided prepare questionnaires which are sent to the adhering governments. When the answers are received they are tabulated, summarized, and published in the form of bulletins, monographs, circulars, monthly, annual and special reports. For the use of the international statistical service each government transmits its crop reports and statistics to the institute either by cable or by mail, or both, and the international reports prepared by the institute are returned to each country in the same way. The crop reports of the United States are transmitted by the Bureau of Markets and Crop Esti-

mates through the radio service of the Navy Department. French is the official language of the institute and all publications are printed originally in French. However, most of the publications are translated and published in English, for which purpose the United States annually contributes \$5,000 in addition to its contribution for the support of the institute. A limited number of copies of the various bulletins and reports of the institute are sent to the Bureau of Markets and Crop Estimates of the Department of Agriculture for distribution to libraries and other institutions.

This in a general way is a brief outline of the history, organization and work of the International Institute of Agriculture at Rome. It began to function about 1910. Its service developed and expanded during the next four years. Then came the World War, which was a severe test of its stability. The countries opposed to the allies withdrew their support and representation, and these relations are only now being resumed. The United States was without representation from the death of Mr. Lubin in January, 1919, until November, 1920, when the general assembly met for the first time since 1913. It was believed, therefore, that the general assembly meeting of 1920 would be a most important one and that it was highly desirable that representatives of the United States should participate in that meeting.

#### GENERAL ASSEMBLY MEETING, 1920

At the last meeting in Rome, November 3-10, 1920, American agriculture was represented by three delegates: Thomas F. Hunt, Dean of the California State College of Agriculture, serving temporarily as the permanent delegate of the United States; Harvey J. Sconce, ex-President of the Illinois Agricultural Association, representing the American Farm Bureau Federation; and Leon M. Estabrook, Chief of the Bureau of Crop Estimates of the United States Department of Agriculture.

The general assembly organized by dividing into four commissions corresponding to the four divisions of the institute, administration, statistics, agricultural intelligence and plant diseases, and agricultural economics. In recognition of the fact that the Bureau of Crop Estimates had developed the best system of agricultural statistics and crop reporting in the world, Mr. Estabrook was selected to preside over the commission on statistics. The American delegation advocated the strengthening and broadening of the international statistical service, the reorganization of the personnel of the institute on a more economical and efficient basis, and liberal increases in the salaries of the personnel. The American delegation submitted a list of specific recommendations, including the taking of decennial censuses of agriculture in all countries, and these recommendations were approved. The recommendations adopted by the general assembly were as follows:

(1) The establishment of an advisory committee for each of the three important sections of the institute, that is, the statistical office, the office of agricultural intelligence and plant diseases, and the office of economic and social institutions, such advisory committees to be composed of a small number of competent specialists who would give advice by correspondence and meet at Rome once a year to discuss the work of the institute with the permanent committee and chiefs of sections.

(2) The general assembly expressed a desire that the most cordial cooperation may be established between the International Institute of Agriculture and the League of Nations.

(3) The general assembly recommended that with the consent of the adhering governments the institute establish direct relations with agricultural societies and associations in the different countries in order that it may better cooperate with them in all matters relating to the common interests of farmers.

(4) That the adhering governments be invited to send to the institute scientists and students to complete their general education with respect to agriculture by a study of the organization and functions of the institute, the data collected by the institute, or contained in its library and files, and to this end it was recommended that scholarships be established for the benefit of such scientists and students.

(5) That the crop reports be sent to the institute by the adhering governments not later than the 10th day of each month and that the institute publish its report based thereon as soon as practicable thereafter.

(6) That the institute urge upon the adhering governments to improve their statistical services along lines already demonstrated to be practicable in several countries.

(7) That the institute obtain from the adhering governments statements showing the methods of crop and livestock reporting now employed by them with full explanations.

(8) That the institute urge upon adhering governments the prompt furnishing of livestock statistics periodically in detail according to the age classifications approved by the general assembly.

(9) That the institute urge the adhering governments to provide the necessary machinery to furnish periodical reports on visible and invisible stocks of the different staple crops.

(10) That the permanent committee be directed to continue the preparation of world balance sheets of the principal crops.

(11) That the permanent committee be directed to see that agricultural prices are reported regularly.

(12) That the permanent committee be directed to prepare a program of proposed investigations to ascertain intensification of agriculture.

(13) That the institute ask the adhering governments to indicate the present state of the organization of agricultural meteorology from three points of view, scientific, legislative, and administrative, together with suggestions, as the general assembly is considering the advisability of creating a permanent committee on meteorology to be composed of members appointed by the minister of agriculture in each country from among its meteorologists, agriculturists, phytopathologists, agriologists, and malarialogists, this committee to meet in Rome at the same time as the general assembly.

(14) That the governments which were represented at the international conference for the organization of a campaign against locusts be asked to ratify the convention adopted at that conference and proceed to make it effective.

(15) That in each country there be organized an office of agricultural cooperation, the International Institute of Agriculture to centralize the studies to be carried on by such offices.

(16) That a study be made of the olive insect (*Dacus oleae*) and a complete circular on definite methods of destroying it be published.

(17) That there be created an international institute of phytopathological research.

(18) With respect to economic and social studies the general assembly recommends that the institute issue bulletins, monographs, and an international annual of economic and social institutions, and a vocabulary of terminology.

(19) That the institute organize on an enlarged scale a study of the economic, legal, and social conditions of farm life, including material, social, and moral factors.

(20) That the institute communicate to the various governments and countries adhering to the International Bureau of Labor an address concerning the regulation of farm labor, which was delivered at a meeting of the fourth commission of the general assembly on November 8.

#### RECOMMENDATIONS TO IMPROVE INTERNATIONAL STATISTICAL SERVICE

The International Institute of Agriculture can be utilized by the United States to good advantage along two lines: (1) To bring together and summarize periodically official crop and livestock reports containing agricultural statistics and economic data, so far as they are issued by the principal governments; and (2) to improve the crop reporting and statistical organization and service of backward countries. Both of these services are important, but to my mind the second function is more important than the first, because the Department of Agriculture can and does obtain directly from the various governments all the agricultural statistics issued by them, but many countries are still backward in developing the proper organization or proper methods of crop reporting and statistics, and the United States Department of Agriculture can not directly make suggestions to them. However, all countries which have joined in the international treaty establishing the International Institute of Agriculture, and they include all countries of agricultural importance, are under obligation to follow the suggestions and comply with the requests of the institute. The institute, therefore, can be utilized by the United States as an official means for encouraging the different countries of the world to develop better and more uniform systems of crop reporting, periodical censuses of agriculture, and thus gradually bring about improvement in the dependability of statistical and economic data supplied by them. At the last general assembly meeting it was quite apparent that the delegates from the countries of western Europe were most concerned in developing the work of the third commission, that is, the international service which will give them the latest information on improved methods of production and the most effective means of combatting plant and animal diseases and insect pests. They were not particularly interested in even maintaining the present statistical service. It is, therefore, highly important that the United States shall have adequate representation, both upon the permanent committee and at future meetings of the general assembly. I would therefore recommend:

(1) That every effort be made to appoint as our permanent delegate a man of broad experience in agriculture, one who understands the needs of agriculture in this country, a good administrator, a diplomat, and a man who has a good working knowledge of French. Such a man could accomplish five things, namely, (a) represent American agriculture, (b) help reorganize the institute along more economical and efficient lines (c) keep the United States informed of interesting situations as they develop, (d) act as expert adviser to traveling representatives of the Government in Europe and to American delegates to the general assembly meetings, and (e) pass along to his successor the results of his knowledge and experience in the institute, its organization and procedure. The position of permanent delegate is in the State Department, but appointments so far have always been made upon recommendation of the Secretary of Agriculture and instructions to the permanent delegate have been prepared in

the Department of Agriculture. Our difficulty in the past in inducing a suitable man to accept the position has been the question of salary. The salary is \$3,600 per annum, with no allowance for travel, clerk hire, or other expenses. This is not sufficient to attract men of the calibre, reputation, and standing desired because it would involve a financial sacrifice on their part. The Department of Agriculture with the support of the American Farm Bureau Federation succeeded in having the salary of the permanent delegate raised to \$5,000, effective January 1, 1922, but failed to obtain any allowance for travel or other expenses. It is highly important that the permanent delegate be able to visit the departments of agriculture in the countries of western Europe and still more important that he visit the United States once a year to keep in touch with American agriculture and revive his Americanism.

(3) That every effort be made to have the United States strongly represented at the next meeting of the general assembly in May, 1922. The whole subject of reorganization of the institute will come up for discussion at that time, as will also the proposal to make English as well as French the official language. It is important that the English speaking countries, because of their great interest in agricultural production and prices, their interest in the service to be performed by the institute, and their relatively large contributions for its support, should have something to say regarding the development of the international service for which the institute was created. Since the death of Mr. Lubin the Latin countries have had a predominant influence in shaping the policy and work of the institute. Their interests are not the same as ours and their interests, not ours, will be promoted and safeguarded. I would, therefore, recommend that Congress appropriate sufficient funds to pay the necessary travel expenses of a strong delegation to the next general assembly meeting. This delegation should include an agricultural statistician, an agricultural economist, a plant pathologist, an entomologist, a meteorologist, a representative of the agricultural colleges, and a representative of the American Farm Bureau Federation. While in Europe the delegation should be authorized to visit the capitals of other countries of easy access to Rome, to study the organization and work of their departments of agriculture, scientific research, and extension, their chambers of commerce and other institutions, in order that they may bring back to this country full information with respect to their organizations and the agricultural, financial, and economic situations in Europe. I would also recommend that each of these delegates be asked to keep a diary of his observations and impressions and required to submit a written report upon his return to the United States for the information of the Department of Agriculture and for future reference. I would further recommend that the delegates from the United States be appointed several months in advance in order that they may have an opportunity to properly prepare for the meeting, to review their French and their knowledge of the geography and history of European countries, and familiarize themselves with world statistics of crop production, consumption, distribution, and similar data, and with the organization and functions of the International Institute. Such preparation would enable them to intelligently formulate a program on which they could unite and take concerted action in the sessions of the general assembly. Without an opportunity for such preparation a delegate is necessarily greatly handicapped.

(3) The last general assembly recommended that the contributions of the adhering governments for the support of the institute be increased 150 percent so as to provide for salary increases and for expansion and development of its various services. This would increase the quota of the United States from \$8,000 to \$20,000 per annum. Many of the adhering governments have already provided this increase. It will be extremely embarrassing to the delegates from the United States at the next general assembly if Congress fails to provide a similar increase in the quota of the United States. I would, therefore, recommend that Congress be strongly urged to increase the quota of the United States in the same proportion as other countries of the first rank.

#### SUPPLEMENTING THE SERVICE OF THE INTERNATIONAL INSTITUTE

The International Institute depends for its data upon the official reports of adhering governments. While government sanction has the advantage of insuring that the reports shall be unbiased and authoritative it has the great disadvantage of involving more or less delay. To overcome this disadvantage the Federal Department of Agriculture is endeavoring to organize and arrange for the prompt transmission, by cable when necessary, of four kinds of information, namely, (1) official reports as soon as issued by the various foreign countries without waiting for them to go through the International Institute, (2) information regarding material changes in crop and livestock conditions without waiting for the governments concerned to prepare and issue official reports, (3) crop and livestock reports and statistics not usually included in the regular government publications, and (4) information relating to market conditions, economic data, opportunities for expanding trade in American farm products, and the like. To this end the Bureau of Markets and Crop Estimates secured a special appropriation of \$50,000 for the present fiscal year. Two regular agricultural commissioners are employed, one at London and one at Buenos Aires, both of whom are arranging for the steady flow of crop, market, and financial reports to the Washington office. Three cotton specialists were sent to Europe the past summer to attend the World Cotton Convention at Liverpool and a meeting of the International Chamber of Commerce at London, and every important cotton port and milling center in Europe was visited, as well as the cotton areas in Egypt and Palestine. A specialist in the marketing and distribution of meat in foreign countries was sent to western Europe this fall to study the livestock and meat situation. These specialists were followed by Professor Warren of Cornell and Mr. Callander of the Bureau of Markets and Crop Estimates to make a special study of the statistical and trade organizations of Europe with a view to collecting information on the present economic situation and outlook for agricultural products, to arrange for the steady flow of information from foreign sources, and to formulate a systematic program for the future.

In addition, the bureau has obtained the cooperation of the State Department in utilizing American consuls throughout the world to collect crop and livestock and market information, and detailed instructions have been drawn up for their guidance. Cooperative relations have also been established with the Department of Commerce and the chief of the

Bureau of Foreign and Domestic Commerce has placed at the disposal of the Department of Agriculture all the trade commissioners and commercial attachés throughout the world. Both the trade commissioners and the consuls are instructed to cable to Washington without delay information regarding any material change in crop and livestock production or movement.

As the result of arrangements already made the bureau is now obtaining official reports from some foreign countries from four to six weeks sooner than was possible formerly and sooner than was possible to obtain it through the International Institute. This applies especially to wheat and to cotton.

The bureau is further planning to employ a corps of commodity economists, each of whom will bring to a focus all the information obtainable with respect to his particular commodity and be responsible for preparing special articles and monthly reviews in popular form of the world situation with respect to the consumption, supply, demand, and surpluses and deficits, based on all information available. These unbiased, authoritative statements of the essential facts with respect to supply and demand will be available for interpretation and application by the agricultural colleges, the extension services, the county agents, farm organizations, and business men as a basis for intelligent programs of production and marketing. It is not the intention of the department to duplicate the organization or work of the International Institute of Agriculture, or of the Department of Commerce, or of any other Federal or international agency, but to supplement the work of these organizations to the end that agricultural leaders, farmers, and business men may have the latest and most complete information obtainable as a guide. I am in favor of strengthening and improving the International Institute of Agriculture in every way possible and am glad to have had this opportunity to speak to this gathering of agricultural leaders on a subject which hitherto has not received the attention which its growing importance as a factor in international economics deserves.

The following paper was presented by Dean Alfred Vivian, College of Agriculture, Ohio State University:

#### WHAT ARE THE AIMS OF COLLEGIATE INSTRUCTION IN AGRICULTURE?

BY ALFRED VIVIAN

I feel that it is only just to myself to explain that my appearance on this program is an eleventh hour arrangement, necessitated by a late notice from the speaker originally selected that he would be unable to be present. Since so little time was left I was asked merely to open a discussion in which it is hoped all will freely participate.

There is a story to the effect that Michael Angelo had an especially brilliant pupil who submitted to him a painting which was remarkable both in conception and in workmanship. Angelo, however, realized that the student had not fully appreciated the possibilities of his subject, and by way of criticism he wrote across the top of the picture the one word "Amplius" (more largely). I have never heard a speaker on agricultural education, or read an article on the subject, that I did not feel like saying



with Angelo—"Amplius." We all, I am afraid, fall far short of realizing the possibilities and potentialities of agricultural education.

Why should we have college courses in agriculture at all? Dean L. H. Bailey is reported to have said that a college course in agriculture is not for the purpose of preparing farmers, but to give to young people a college education through agricultural subjects; that its chief value lies in the fact that it utilizes the material of daily life for educative purposes and thus puts new vitality into the college curriculum.

There is no doubt that a college course in agriculture would be important for that reason alone, since agriculture contains a remarkable wealth of material of high educative value, not merely to the prospective farmer; but to any one desiring the larger outlook upon life which is obtained through a college education. A well-rounded collegiate course in agriculture provides a first-class preparation for life because it consists of a broad application of the principles of the natural sciences, of economics, and of sociology to the affairs of daily life. These subjects are motivated and vitalized by their application, and thus make a much stronger appeal to the average student than is possible in the usual abstract treatment of these sciences. A few days since, I met upon the street one of the 5 percent of our graduates who have gone into commercial work for which, at first sight, a college course in agriculture would scarcely seem the proper training. I said to him, "If you were entering college now, knowing that you would eventually land in your present position would you take the agricultural course?" His reply was: "If the various courses at the university were the same as when I entered I certainly would take the course in agriculture even though I knew that I would finally take up commercial work such as I am now doing. Perhaps the new courses in commerce now offered would be more valuable to me, but I should examine them carefully before deciding against agriculture." I think most of the 5 percent referred to above would make similar replies to that question, and I am firmly convinced that there is no collegiate course which gives a better general preparation for life than a broadly conceived college course in agriculture.

But, in spite of these statements, I doubt whether many of us would agree that there was a place for a specialized collegiate course in agriculture merely as a means of general education. There is, however, a distinct national need of such a course as a part of our plan of universal education. The greatest need of the nation is that there shall be in every farm home in the land a prosperous, happy, contented, intelligent family, and all education in agriculture, whether it be collegiate, secondary, elementary, or extension, must have as its ultimate aim the hastening of the time when such a family shall be found in every farm home. The city man is likely to think that the principal value of the farmer to the nation lies in his ability to produce food and raw materials for the industries, but his importance to the nation lies much deeper than that. The fact is that democracy itself, if it is to live, must be based upon an intelligent and prosperous farming class.

In Germany, in 1912, I spent an evening with a teacher in one of the large universities, who plied me with questions regarding our form of government. He continually expressed surprise that a democracy had continued so long as ours had and pointed to the fact that most democra-

cies of history had been short lived. He remarked: "I am surprised that your democracy has lived so long, but history repeats itself and, of course, your democracy will sooner or later perish." He overlooked the fundamental fact that in the United States of America was established the first republic or democracy which has as its foundation an intelligent, thinking farming class instead of an ignorant peasantry. So long as the farm homes of the Nation are occupied by intelligent people, democracy will persist, but an ignorant peasantry spells the doom of democracy, and some of our sociologists are wondering whether there is not danger at the present time that the American born farmer may be replaced by the non-English speaking immigrant who is untaught regarding our form of government.

Not all people realize that what the country is today, as regards population, the city is tomorrow; that, in other words, our city population is made over from the country in every four generations. An analysis of the population of our cities would show that approximately 40 percent of the people were born on farms; that about 31 percent more are sons or daughters of farmers; that in case of the next 17 percent one or more of their grandparents were born on farms; and that the next 12 percent trace back to the farm in one more generation. Do you not see, therefore, why I say that the safeguarding of the democracy requires that our farm homes should be occupied by prosperous, happy, contented, and intelligent families, and that the aim of all agricultural education should be to assist in bringing about that condition of affairs? What part has the college to take in the program?

#### A SCIENTIFIC, PRACTICAL FARMER THE AIM OF AGRICULTURAL TEACHING

The first aim of the collegiate course in agriculture should be to prepare scientifically trained, practical farmers. One of the greatest needs of farming today is that there should be more agricultural college graduates living on farms. They are needed there to increase the average intelligence of the community; to assist in better government, and make possible the production of larger quantities of food and raw materials in the future. The food situation itself demands serious attention. Assistant Secretary Ball has said that if the present rate of increase of population continues without greater rate of increase in food supply, we shall in ten years become a food importing nation instead of a food exporting nation. And yet it is possible to produce within our own borders sufficient food to support a population of three hundred thirty-three million people. Such production is possible only with a highly enlightened farming class, and with an average of education much beyond that of the present day. We are sometimes too prone to feel that extension in agriculture will take care of the situation, as far as the practical farmer is concerned, and lose sight of the fact that present extension methods are only temporary measures to take care of the urgent needs of the present. (Note that I say "present extension methods." I think that agricultural extension work will be a permanent feature of our educational system, but the character of that extension work will have to be changed from time to time to fit the changing condition of our American agriculture.) I doubt if the time will ever come when all farmers will be college trained, but our ideal should be to have a group of agricultural college graduates in every com-

munity as leavening agents for the whole mass. There are already enough such men really accomplishing things on our American farms to demonstrate their value to the community, and to the cause of agriculture. I realize the need of the agricultural college trained men in education and research, and I would not decrease the number going into these lines. The answer must be in increased attendance upon our collegiate courses in agriculture, so that we can send more graduates back to the farm. I am afraid some of our colleges have been remiss about holding up before the student the ideal of service through farming, and are guilty of the accusation sometimes made against agricultural colleges that they "educate away from, instead of toward the farm."

While not all of you will agree that the principal aim of the collegiate course in agriculture is to prepare practical farmers, many of you will accept that statement, but will look askance at the methods and curricula proposed to that end. There have been three easily recognized stages in the development of the college curriculum in agriculture. In the beginning, because there was little known content in agriculture, the college curriculum was in reality not much more than a course in the natural sciences; then, as the experiment stations provided the strictly agricultural material in abundance, the reaction against the old type of curriculum resulted in some instances in courses made up largely of instruction in the technique of agriculture with too little of the fundamental reasons underlying it. It became, in other words, a curriculum of "hows" with a modicum of "whys." This could not but prove unsatisfactory in the end, and now the tendency is to look for that saner middle ground which builds technique upon a solid foundation of fundamental facts and reasons. Educators are beginning to realize that agriculture as a calling is not in the trade class, but that it is a business, an art, perhaps a profession, based upon broad applications of the natural sciences, of economics, and of sociology. We want no rule-o'-thumb farmers graduated from our colleges, but men with deep insight into the basic facts and theories of the agricultural sciences.

While many will agree that the agricultural student should be well grounded in the sciences, there may be some difference of opinion as to how this foundation may best be obtained. In saying that the student of agriculture should have a strong background of science, I do not mean that he should necessarily spend more time on science than he now does. In fact, some of our agricultural college curricula now have more time devoted to the general sciences than is necessary. The trouble is that too much of the student's time is taken up with material that never functions in his college course, or in his life. It would probably be no exaggeration to say that most college courses in the sciences or in the humanities would be much improved if they were given in two-thirds or one-half of the time now devoted to them. This does not mean that the student's time is not now fully occupied, but that too much of his time is devoted to things which are of very doubtful value to him. He has to consume too much chaff to acquire the proper amount of grain. Many courses should be abbreviated, not by presenting all the material now included in them in a superficial way, but by selecting the important material and discarding the rest. I am convinced that at the present time the colleges are wasting a large part of the student's time. One dean of an agricultural college

told me some months ago that he had been visiting classes and he was amazed at the degree of "dilution" of many of the courses. Perhaps "padding" would have been a better word, for he did not mean that the courses were "easy."

The instructor in his own preparation for college teaching has read everything he can find on his subject, good, bad, and indifferent. He knew much of it was chaff, but he wanted to be sure that he had found all of the grain, and was afraid to overlook any article, chaffy as it might appear. In this laborious way he built up his fund of knowledge, and it is perhaps natural that he should expect his students to follow the same road. If he does so, however, he overlooks the fact that one of the principal functions of the teacher is to sort the kernel from the chaff and present to his students only the winnowed grain. He should save his students from the necessity of wasting as much time on almost profitless search as he had to devote to it. Please understand that I am not pleading for easy, pre-digested courses in science, but for courses which are concentrated food from start to finish and high in calories. It is surprising how much of what we teachers know is not worth knowing. Why not save our students the necessity of learning it? In my college student days I had a course in organic chemistry running through two years, and I afterward taught agricultural chemistry for several years. A short time ago, in preparing a paper for an educational society, I looked over the old text-books and note-books and blue penciled those things which had actually functioned in agricultural chemistry, and came to the conclusion that all that was of real use could be taught in one semester. The rest of the course was devoted to a detailed study of organic compounds with which the agricultural chemist has no concern. The part of the course which was most valuable was that devoted to fundamental principles and to sources of information, and that could have been taught in a much shorter time. There has been much talk about the waste of the student's time due to duplication of matter in the different departments, but I feel sure that the loss in this way is not nearly so serious as that due to the inclusion of so much non-functioning material in the department courses.

The collegiate curriculum for the preparation of farmers, then, should provide a broad foundation in the sciences, in English, and other fundamental subjects, but the time devoted to these subjects should be kept to a minimum, by giving concentrated courses in which all non-essential matter is excluded. The student should also be required to pursue one general course in each major line of agriculture, so that he may have a well-rounded conception of the field of agriculture, and he should be required to carry a major line for at least four terms. The curriculum should permit of a limited amount of undergraduate specialization, keeping in mind that any intensive specialization should be done in graduate work. And, finally, sufficient opportunity should be allowed for electives so that the student may, with the help of an adviser, select such subjects as will best prepare him for his chosen field.

The following curriculum which is in force at Ohio State University represents not what we consider ideal, but the nearest approach to the ideal which we have been able to reach under our present university organization:

SUMMARY OF REQUIREMENTS FOR GRADUATION, COLLEGE OF AGRICULTURE, OHIO  
STATE UNIVERSITY

*Required General Subjects—*

	Semester hours
Chemistry .....	8
Botany .....	6
Zoology .....	6
English .....	4
Economics .....	6
Physics .....	3
Geology .....	3
Mathematics .....	3
Drawing and shop .....	6
	<hr/> 45

*Required Agricultural Subjects—*

Agricultural chemistry .....	5
Soils .....	5
Agricultural engineering .....	4
Animal husbandry .....	4
Dairying .....	4
Entomology .....	3
Farm crops .....	4
Horticulture .....	4
Rural economics .....	3
	<hr/> 36

*Major Subject* ..... 12

(In addition to above.)

*Agricultural Electives* ..... 23

*General Electives* ..... 20

(These may be taken in any college in the university or may be agricultural subjects if the student desires.)

Total .....	<hr/> 136
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The chief obstacle in the way of arranging the best curriculum for the student is the tendency on the part of the teacher to magnify the importance of his own subject and his own department. It is to be feared that some teachers think more of what they are to get in the way of recognition than they do of the best interest of the student. This feeling leads them to demand that an unreasonable portion of the curriculum shall be devoted to their subjects, and the desire to make a large showing often leads the departments to sub-divide their course to an absurd degree. Some of this sub-division is due, however, as Dr. True's report this morning stated (see p. 94), to a lack of understanding of pedagogical principles on the part of the teacher.

In passing it may be said, that while a broad foundation in the sciences is necessary to a strong agricultural curriculum, it does not follow that these courses must be taught under the names of the so-called "pure" sciences. A thorough grounding in the principles of botany, for instance,

must be provided, but there may well be cases where a principle can be better taught by the agronomist or horticulturist than by the botanist. The principle is just as valuable to the student wherever he learns it, but he must learn it somewhere if he is really to understand his agriculture.

#### PREPARATION FOR RESEARCH WORK ALSO ESSENTIAL

The second aim of collegiate training in agriculture is the preparation of men for research work, in order to add to the fund of knowledge pertaining to agriculture. This is only another part of the plan to keep a prosperous, happy, contented, and intelligent family in every farm home, for it is only through exhaustive research that we can obtain the knowledge which will become increasingly necessary as our farming problems continue to become more and more complex. The college training foundation for the researcher in agricultural lines should be the same as that for the practical farmer. The researcher needs the background of practical agriculture, for it takes no very exhaustive study of experiment station reports and bulletins to show that there is much waste of time and experiment station money due to a lack of such a background on the part of some members of the staff. I agree that there should be a broad training for the prospective research man, but I should not agree with some as to what constitutes a broad training. I still maintain that too much of the student's time is wasted in learning mere facts when what he needs is training in fundamental principles, and a thorough introduction to the sources of information. Many teachers seem not to realize that the student can learn something about his subject by himself and even after graduation if he is only properly started, and the college course is not supposed to do more than properly start the student on the road to knowledge. Yet one is sometimes led to think that the teacher believes that the student's power to learn will cease with his graduation.

The training for the researcher in agriculture, then, should consist of a general course in agriculture with a limited amount of undergraduate specialization and with some intensive graduate work in his chosen field and in closely allied subjects.

I am fully aware that certain directors of experiment stations have, before this body, very severely criticized the scientific training given the student in agriculture, and have said that they prefer as researchers the men trained in general science to the graduates of the agricultural curriculum. In private conversation, following the reading of these papers, some of them have admitted that they were comparing agricultural men having only a baccalaureate degree with general science men who had more or less graduate work to their credit. The fact that, in the past, the bachelor in agriculture could command as high a salary as the doctor in general science, has meant that there was little financial inducement for graduate study on the part of agricultural students. With an equal amount of specialized graduate work, my observation makes me believe, the experiment station researcher will accomplish more that is of value than will the man whose training is wholly in the general science or arts courses.

The experiment stations were established for the purpose of discovering those facts and laws which are of import in agriculture, and their

work is justified only when it makes a contribution to that end. I am fully in accord with the idea expressed in this convention, that the experiment stations must carry on what some call "fundamental research" in the sciences even when this investigation seems to have little relation to agriculture. The fact remains, however, that such research in an experiment station is justified only because the so-called practical things of agriculture can not be interpreted until the fundamental laws of the related sciences are discovered. My contention is that the man with a good background of agriculture is more likely to work on those fundamental matters which are really essential to the solution of our agricultural problems. The experiment stations must insist, however, that he be adequately prepared in his chosen field by graduate training, for it must be obvious that the young man who has just received his degree from any college is seldom capable of conducting worthwhile original research. An experience covering a good many years with rather unusual opportunities for observation and personal contact with men leads me to place continually increasing emphasis on the importance of the "point of view" of the researcher and the teacher.

#### TEACHERS NEEDED WITH THE RIGHT POINT OF VIEW

The third aim of college training in agriculture is the preparation of teachers, for colleges, for secondary and vocational schools, and for work in the field of agricultural extension. The curriculum for this purpose should be built upon the same foundation of general training in the fundamental sciences and agricultural subjects as has been outlined for the practical farmer and for the researcher, since it is absolutely necessary that the teacher should have the right perspective. In addition to his general foundation the prospective teacher should have a small amount of undergraduate specialization, and should be required to carry a limited amount of professional educational subjects, such as educational psychology, principles of education, methods of teaching, and supervised practice teaching. The time is probably not far distant when graduate training will be required for all secondary and vocational teachers, and for extension workers in agriculture, as well as for the college teacher. General information on agriculture is becoming so common that the man with only his baccalaureate degree will soon come to feel that his preparation is not sufficient to enable him to teach without danger of personal embarrassment.

It has been conceded, for many years, that the high school and elementary teacher should be trained in the principles and methods of teaching, but it is only very recently that any serious consideration has been given to the matter of professional training for college teaching, although it has been notoriously known for many years that the average of college teaching was distinctly lower in quality than the teaching in our high schools. It is gratifying to see that this association is, as shown by its programs of the last two years, giving some time to the discussion of the problem of improving the quality of college teaching. In our own college, I have notified the heads of departments that I shall not, in the future, approve the appointment of any new instructors unless they have had at least educational psychology and principles of education, or will agree to take those subjects at the first opportunity after appointment.

I am convinced that these subjects are also quite as essential to the extension worker as to the college or secondary teacher, and I feel that the time has come when we should more seriously consider the matter of special training for those who are going into the extension field.

Please allow me to repeat that what has been said in the course of this talk about the shortened courses in the sciences and agriculture must not be construed as advocating easy courses in any subjects. These courses will, in a way, be more difficult since they will deal with principles, the learning of which will continually tax the student's reasoning power. The material eliminated from the courses is that matter which involves, almost entirely, the power to memorize, and is, therefore, of the least educational value. Shortening the time devoted to these subjects opens the way not merely to more intensive training in the major field, but permits of a curriculum broadened to include important subjects which are now excluded because of lack of time. After all, the old advice to "learn something about everything, and everything about something" is not bad advice if sanely interpreted.

To summarize, then, it may be said that the one great aim of all agricultural education, of whatever grade, is to hasten the day when there will be a prosperous, happy, contented, intelligent family living in every farm home.

The college can assist in this program:

(1) By preparing scientifically trained, practical farmers, who will be outstanding leaders in their communities, and who will by their example "leaven the whole lump."

(2) By preparing researchers for the experiment stations and the United States Department of Agriculture, who will approach these problems with a keen scientific spirit and with broad agricultural sympathy and understanding.

(3) By training teachers for colleges, secondary schools, and extension service who will be well-grounded in agriculture and teaching methods, and above all, who will have the right point of view, will be filled with a keen appreciation of country life, and imbued with a genuine sympathy with the problems of the farm and the farm home.

Adjourned.



## SECTION OF AGRICULTURE—EXPERIMENT STATION WORK

TUESDAY MORNING, NOVEMBER 8, 1921

The meeting was called to order by the secretary, T. P. Cooper, Director Kentucky Experiment Station, who, on motion, was made chairman for the meeting in place of F. S. Harris, resigned. F. B. Morrison of Wisconsin, was named secretary vice T. P. Cooper.

C. R. Ball, Cerealist of the United States Department of Agriculture, presented the following paper:

### FEDERAL AND STATE COOPERATION IN CEREAL RESEARCH

BY CARLETON R. BALL

The writer wishes to express his appreciation of this opportunity to present an outline of the subject of Federal and State cooperation in cereal research before the Sub-section of Experiment Station Work. During the last 20 years and more, he has enjoyed an active association and friendship with so many of the present directors and their predecessors that this seems a very home-like place. Though never himself a station director, he has the direction of large and varied projects, chiefly investigational, supported by more than \$400,000 of Federal funds, and so perhaps has acquired something of the director's point of view.

About a quarter of a century ago, a controversy arose over lines of Federal experimentation inaugurated in one or another of the States without previous announcement and cooperative agreement. The flames of this controversy rose and fell with the fanning winds of provocative action, and much valuable timber was burned before the fires finally were extinguished. The writer naturally held the opinion then fairly prevalent among State workers as to the questionable ethics of uninvited and sometimes unannounced independent Federal activity in experimentation within the various States.

The viewpoints presented in this paper are essentially those originally held. The experiences of nearly 25 years devoted to the investigation of agricultural problems, at first in a State experiment station and throughout the last 21 years in the United States Department of Agriculture, have served only to intensify them.

During the period named it has fallen to his lot to conduct or direct independent or cooperative investigations in nearly all of the States of the Union. Working at first with forage plants, and, since 1906, with cereals, an increasing proportion of the investigation has been made cooperative, until now more than 95 percent of that done in the field is on that basis. Some of these cooperative contacts have been maintained for more than 10 years, apparently to the growing satisfaction of both cooperating agencies. The opinions expressed here are based, therefore, not on theory, but on experience.

In canvassing the arguments for and against State and Federal cooperation in cereal research, there are eight reasons why such cooperation seems justified from the standpoints of the greatest efficiency and economy in getting results. These eight reasons are presented in detail.

(1) Cooperation tends to relieve the several States of the necessity of organizing and financing independent attacks on all phases of problems common to two or more of them.

There are many problems which are conspicuously broader in their extent than the limits of a single State. That research on such projects should be limited to what any one State can accomplish is unthinkable. That each State within whose borders the problem occurs should undertake a full program of research upon it is equally uneconomic, especially when conditions are very similar in several States.

There is no fundamental reason, either scientific or administrative, why the directors of stations in a group of interested States should not pool their resources of men, money, and equipment for a joint attack on a common problem. Observation shows, however, that seldom, if ever, has this been done, at least in more than a very limited way, while cases of cooperation between Federal and State agencies are common.

Cooperative attack by several States on a joint problem, under the coordinating cooperation of a national agency, should enable each State to limit its energies and funds to some one phase of the problem most important to it, and thus release other energies and funds for other projects.

(2) Cooperation makes possible a broad and comprehensive survey and a correspondingly comprehensive study of the many phases of a problem of wide geographic range.

Few problems are limited to a single State. When a State worker begins research on an interstate problem, however, he seldom has opportunity to study the aspects of the problem in other States before being obliged to begin work upon it. This may be due to lack of funds, to lack of approval for travel outside his own State, or to hesitancy in entering the territory of other workers. It may be due, also, to concentration on the phase of the problem near at hand. With Federal cooperation, however, the State worker may be sent readily outside his own State, or all State workers interested may be brought together for conference, even though only one of them engages in the research thereafter. In this way, it is made more certain that no important phase of the problem is being overlooked, and that the effort is likely to be rapidly and economically productive.

A good example of this is the organization of the almost nation-wide research on the epidemiology of the stem rust of wheat (*P. graminis tritici* [Erikss.] Henn.), the number and distribution of its biologic forms, and the relation of the common barberry to its production and dispersal. This has involved an intensive study of the inception and dispersal of rust throughout the country, especially in the South, its gradual progression from the sources of origin, and the infection of barberries in the North and the part they play in the spread of this destructive disease.

Another is the project for breeding good milling wheat with greater resistance to cold than any winter wheats now possess. This has required Federal cooperation in at least three groups of States having different climatic conditions during winter, namely, one with comparatively mild winters but subject to winter drought, a second with severe winters but usually with good snow cover, and a third with severe winters but often without adequate snow cover to protect wheat. Without such cooperation

no such experiments could be conducted in most of the wheat-growing area. Other and equally pertinent examples could be cited.

(3) Cooperation enables important advances in scientific knowledge gained at one point to be made immediately available to all cooperating workers, without danger of misuse of research results.

When research is begun on any new and little-known problem, it usually is impossible to follow the original plan of the study very far because new leads continually develop as the study progresses. Important new developments may greatly modify or even entirely change the scope of the project and require a large reorganization of plans. If numbers of independent workers are engaged, each guards his own results, new developments become known only when published, and, in the meantime, other workers may continue to devote time and money to searching in alleys proved to be blind.

On the other hand, a group of associated workers, even though widely scattered in different States, can have their efforts coordinated, through cooperation, like those of the different divisions of an army operating on a wide front. The successes of one are used to the immediate advantage of all others, without in any way detracting from the credit or the responsibility of each unit.

As an example of this may be cited the cooperative research on the scab and seedling blight of wheat and the root, stalk, and ear rots of corn. This investigation has been under way during the past 3 years in a group of North-Central States, with minor phases given attention elsewhere. Effective cooperation has been maintained, three important discoveries have been made at intervals and in different States, and redirection of emphasis has been accomplished from time to time as developments made it necessary. All this has come about with a minimum of expense in time, effort, and money, and with great benefit to science and agriculture.

(4) Cooperation prevents waste of portions of breeding material of little value where originated, but of high potential value elsewhere.

It is a well-known agronomic fact that crop plants and their varieties vary greatly in their adaptations for use under different environments. This is especially true of the inherently variable progenies resulting from hybridization. Any plant breeder, working under one general set of environing conditions, with one general object in view, must necessarily discard by far the greater part of his material because either intrinsically valueless (heterozygous) or not adapted to his conditions. The latter portion, however, may have the highest value elsewhere under another set of conditions. Yet by the originator it must be discarded after some years of labor upon it. Through widely ramifying cooperative arrangements, such material may be sent where it has promise. This costs its creator practically nothing, but saves years of labor to the one who can use it, thus speeding up results while reducing expenses.

A good illustration of this process of salvaging valuable material is found in a cooperative project to produce a rust-resistant variety of wheat. Of the stocks already possessing some degree of resistance to some strains of stem rust, part are spring wheats and part are winter wheats. When crossed to develop new resistant types, some of the progeny have the spring habit and some the winter habit of growth. If a spring-wheat State works alone on this problem, it loses all the progenies having winter habit, as they

will not head when spring sown. A winter-wheat State likewise must lose, during the first winter, all the progenies having spring habit, as they will not survive.

Federal cooperation arranges that the crossed seed be sown in a State with mild winters, where all plants survive. Growth habit is determined, and the spring types sent to the spring-wheat cooperator and the winter types to his winter-wheat brother, and the processes of selection begin under proper conditions for each. Homozygous progenies not suited to their respective States may be transferred later to still other cooperators for trial under still different conditions.

(5) Cooperation avoids the danger of a divided allegiance of the constituencies in any State, such as might result if independent Federal investigation were conducted.

There is a real administrative danger in a divided allegiance within a State. If independent Federal investigation achieves beneficial results within the State it tends to discredit the State institution in the eyes of its supporting constituency. This is the more unfortunate when it is remembered that the State investigator, like other prophets, is not without honor save in his own home territory, while the prestige of the Federal investigator may increase with his distance from his home base.

The State research agency must depend on the good will of its benefited constituents for continued or amplified financial support. Funds for Federal research must be voted, of course, by the national representatives of these same constituencies. Which shall have the funds? Why not both, the one for research within State boundaries, the other for coordinating and amplifying the productive power of all the States? The effect of such cooperation on the total funds made available from all sources is discussed in the next section.

(6) Cooperation enables the production of larger results from the funds invested and tends to increase the funds available.

Cooperation by two agencies on a problem has the effect of doubling the funds available for the study, provided the cooperation is on a 50-50 basis. As each of the cooperating agencies is free to publish the results, always indicating that they were obtained cooperatively, it is enabled to put out a volume of results full double that which would have been obtained by the expenditure of its own funds alone. The indication of cooperation on title page and in text does not disadvantage either agencies in the eyes of its own constituency, so that each gains practically all the advantage of double production.

There is a probability also, as discussed previously, that Federal and State cooperation effects an actual saving of funds through permitting a better view of the entire problem than any one State would be able to get and thus preventing unnecessary expenditures. It likewise should have the effect of preventing unnecessary duplication of expensive investigation by different States.

There also is a strong probability that one of the results of speeding up the solution of problems, through effective cooperative research, is to increase public attention to the benefits of research and hence to aid in getting adequate financial support for future efforts.

(7) Cooperation by one department of a State station with Federal

agencies may lead to increased cooperation between different departments of the station.

Fundamentally, cooperation still is more a matter of individual psychology than of anything in the way of organization, principles, policies, or financial necessities. Nevertheless, it is receiving widespread attention in commercial and sociological circles and by those charged with the conduct of national and international affairs of government. Everywhere the spirit of cooperation is increasing with the growing realization that it makes for more rapid and effective progress in all channels of human effort and at the same time reduces the cost of operation, thereby benefiting the world, both near and far.

Coming back to the discussion of experimenting agencies, the growth of the cooperative spirit is very evident both within and without the individual institutions. Were it politic to do so, good illustrations could be given of the bringing of previously indifferent or antagonistic departments of a State station into friendly working cooperation under the stimulus of the requirements of an attack on some complex problem which the State and the Federal department had undertaken to solve together.

(8) Cooperation gives better opportunity to use to the best advantage the particular talents of any given worker.

In the discussion of research environments, two rather distinct schools of thought are discernible. One insists that the most effective research will be performed by the solitary investigator, cloistered in workshop or laboratory, with adequate equipment, but largely without assistants or other human contacts. The other school claims, with equal insistence, that a trained worker of high caliber can and should expedite and direct the accomplishment of much more extensive research through a corps of assistants, both in laboratory and in the field, than he possibly could accomplish with his own unaided hands and mind.

As usual, both sides are right. Circumstances govern cases. In each individual case, much depends on the character of the personnel and much on the character of the research problem. Some workers are solitary by nature, others gregarious. Some are adapted to laboratory research, others to field studies. To force either to work under conditions repellent to him reduces his efficiency. Some problems are limited and local in character, others complex and of wide distribution. It is obvious that the latter are susceptible of more advantageous cooperative attack.

The more phases of a complex problem are under investigation at the same time and by the same agencies, the more opportunity exists to apply the services of each particular worker to a phase wherein he can accomplish the best results. The organization of a variable personnel is the most difficult part of planning and executing research, and any cooperation which helps in simplifying this administrative problem is of real advantage.

In conclusion, it is hoped that this discussion, though confessedly inadequate, may serve to stimulate thought on the whole range of the subject of cooperation, in principle and in practice. If it accomplishes this object, I am sure it will make for an increasing cooperation of Federal and State agencies in future years.

The paper was discussed by E. A. Burnett of Nebraska, R. W. Thatcher of New York, P. F. Trowbridge of North Dakota, Edward C. Johnson of Washington, and B. L. Hartwell of Rhode Island.

G. I. Christie, Director Indiana Experiment Station, presented the following paper:

#### HOW TO SECURE NATIONAL INTEREST IN THE PURNELL BILL

BY G. I. CHRISTIE

The Purnell Bill (H. R. 2243) introduced in the House of Representatives of Congress provides for increased funds for agricultural experiment stations and enlarges their field of activities. This bill does not propose any new policy on the part of Congress—it is simply asking additional aid for institutions already established by congressional action and now receiving Federal appropriations. The purpose of this bill as stated by Mr. Purnell is to make provision for "the carrying on in a larger way the great work already begun by our agricultural experiment stations."

Section 1 of the Purnell Bill outlines the work that may be undertaken as follows:

"The funds appropriated pursuant to this Act shall be applied only to paying the necessary expenses of conducting investigations or making experiments bearing directly on the production, manufacture, preparation, use, distribution, and marketing of agricultural products and including such scientific researches as have for their purpose the establishment and maintenance of a permanent and efficient agricultural industry, and such economic and sociological investigations as have for their purpose the development and improvement of the rural home and rural life, and for printing and disseminating the results of said researches."

Under the terms of this bill, experiment stations would be authorized to undertake investigational work on marketing, cost of production, farm management, the rural home, rural life, and other new and important subjects which are demanding attention. Experiment station workers will appreciate the importance and value of these provisions. The present urgent demand for information on marketing, cost of production, and other economic subjects has placed the stations in a most embarrassing position. Little work along these lines has been accomplished and but few of the stations are in a position to undertake the necessary studies. The stations are powerless to expand their work on present funds. It is impossible in many institutions to keep the main lines of investigation going.

In commenting on experiment station needs, Dr. Allen, of the Office of Experiment Stations, says:

"The investigational problems remaining are the more taxing because the simpler things have been done and it is the larger and more difficult problems which the stations are now called upon to solve. But the pioneer work they have done in the field of research and the background they have provided has made them able to advance in these newer fields, if they are given the means. Unless the Stations are permitted to advance, the progress of agriculture will be slow and halting, as it was when experience and expensive mistakes were the sole reliance of farming."

Additional funds for agricultural investigations are necessary if experiment stations are to maintain a staff of competent scientific workers. The "turn-over" in these institutions has been unusually heavy in recent years and has meant a great loss to the work. A report from the Office of Experiment Stations shows that of the 1,700 men employed in investiga-

tional work in State experiment stations, 80 percent have resigned during the period of 1914-1919. Of 48 directors of experiment stations in the United States, 28 have resigned in the same period. These resignations and changes in the staff involved 370 heads of departments who were leaders and the most important persons in the organization. It is readily understood that high-class investigational work can not be carried on with a changing and shifting force. Careful, worthwhile investigations require workers who will consecrate themselves to the task and remain with the work until it is completed. The costs and expenses involved in the starting of new workers on projects, only to have them quit when they are acquainted with the problems and before any results are secured, can not be justified, and the conditions responsible for this state of affairs should be remedied.

Agricultural experiment stations are also facing another responsibility which can not be ignored. Through the Smith-Lever Act supplemented by large State and local funds, a live system of agricultural extension has been developed. Extension forces are rapidly using the supply of available information and are presenting many new questions to be answered. On this point Mr. Purnell, in his argument for his bill says:

"Research underlies the entire system which has been built up in this country for agricultural teaching and extension. It is fundamental and absolutely essential to the growth of that system, for it is the only means for developing new information and interpreting it in practical method. In view of this, the question is a very pertinent one, whether this country can afford to prevent the experiment stations from growing by continuing to withhold the necessary support. A system is no stronger than the weakest part, especially if that part is the foundation which sustains and supports it."

If the experiment stations are to continue to be the recognized center and source for agricultural information some early action must be taken. Increased funds for investigational work must be provided.

The question has been raised as to how experiment stations may secure national interest and support. It will be necessary to have public sentiment for the station cause if an increased appropriation is secured. There are yet some people who do not understand the work of the agricultural experiment stations and the direct relation it bears to public welfare. The following extract from a letter received recently from a Congressman, is in answer to a request for support for the Purnell Bill:

"I wish everyone could appreciate how important the farming industry is and how much every other business depends upon the success of the farmers' industry. It is surprising here sometimes to hear representatives in Congress from the large commercial centers of the east, oppose everything looking to the advancement of the farmer and offer in opposition the statement that we are doing nothing for the benefit of the manufacturer or those working in our manufacturing service. So short-sighted are they that they do not realize that everything that benefits the farmers has a resulting benefit for the industries and the man working thereunder that they claim to represent."

It seems that more should be done to emphasize the fact that the successful development of agriculture is of national interest. The report of the agricultural committee of the recent National Conference on Unemployment states that agriculture provides more than one-half of the

raw materials used in manufactures, furnishes approximately 50 percent of the gross freight revenue of the railroads, and makes a consumer's market for 40 percent of all manufactured goods. Every manufacturing, transportation, commercial, and financial enterprise and every home in the land is vitally interested in the prosperity of agriculture.

In addition to all this the nation is vitally interested in the economical production and marketing of a large and sufficient food supply. The assurance of food at a price people can pay is the basis of progress in America.

The story of the development of agriculture in the United States is interesting and inspiring. The restoration of worn-out soils; the treatment of special soils; the introduction of new crops; the irrigation of arid lands; the control of injurious insects; the control and eradication of plant and animal diseases, the extension of the corn belt in northern States; the improvement gained through the breeding of plants and animals; the perfection of the Babcock test for the determination of fat in milk and its products; the development of the silo and many other fundamental lines of work serve as the foundation for our agricultural progress. This great work, too, is the result of wise leadership and the conscientious labors of the agricultural experiment stations.

These activities and results are familiar to most agricultural workers, but they have never been presented or made known in any large way to the people of the country.

Again, few people have any comprehensive understanding of the big agricultural problems now before the experiment stations. Little has been done to point out the importance of immediately starting investigations. A great weakness in experiment station work is that many times an urgent problem presents itself and assistance is demanded before investigations are started. Greater results will be secured and stations will mean much more to agriculture when these large problems can be anticipated and investigational work undertaken so that usable, worth-while information will be available when needed. Of course, it is understood that there are bound to be many emergencies and stations must adjust their funds and forces to meet these.

A few of the problems that are receiving some attention but demand a large amount of further investigation are here noted. There are immense areas of logged-off lands in the northwestern and southern States. These constitute one of the large potential agricultural assets. In the State of Washington alone, it is estimated that there are fully two million acres of such land suitable for agriculture when cleared of stumps. Just how to bring such land into profitable cultivation is an important field for experiment station work. The country as a whole is interested in having some practical plans developed.

The western ranges, which have been the source of a large and cheap meat supply, are being rapidly reduced. The nation will soon be, if it is not already, confronted with the problem of developing livestock production under widely different conditions. Extensive experiments should be undertaken to determine the most profitable and successful methods of producing meat in the several States.

The soil problems of the various States are far from being solved. The different types require quite different treatment and vary greatly



in their adaptation. In many cases conditions are so radically different in different parts of a State that it is many times impossible to use in any general way the results secured at a central station. It is, therefore, necessary to conduct district or county experiment stations in order that the best results may be secured. This adds very materially to the expense of investigational work, but it is necessary in order to give the most valuable assistance.

In the western States there are large tracts of land which must be dry-farmed on account of the low rainfall and where it is not possible to have irrigation. In this system of farming drouth-resistant crops and special methods are employed. In this way large areas have been brought under cultivation, but in many sections problems present themselves for solution. For example, such a system exhausts the fertility rapidly and is not permanent because of its destructive effect on the humus or organic matter. Means for restoring and maintaining this important element must be found. Investigations are necessary in order that the answer may be furnished to the farmers of those sections.

The corn belt is now threatened with the European corn-borer which has recently been found in northern Ohio and in eastern Michigan. Up to this time no satisfactory, practical means has been worked out for the control of this insect. The country is deeply concerned as to whether the insect will be permitted to move westward and cause great losses or whether some method will be found to control it. The State experiment stations should be in a position to take up extensive and fundamental studies to determine the best means of combating this pest.

The work of the agricultural experiment stations is deeply appreciated by the agricultural people. More and more it is recognized that the stations are most important forces in working out the present complex agricultural situation. The urgent need for increased funds should be recognized and every effort made to provide these. Farmers, individually and through their organizations should give their support to the Purnell Bill. President Howard of the American Farm Bureau Federation has already given his endorsement and has personally aided Congressman Purnell in forwarding the measure. The agricultural and daily press have shown a sympathetic attitude and stand ready to work for this assistance for the stations. Other forces including chambers of commerce and business men's associations are ready and willing to lend active support. In fact no real opposition has been disclosed. The main handicap has been the financial conditions of the country and the demand upon Congress to reduce appropriations. So far as can be learned there is no disposition on the part of the administration or Congress to interfere with or cripple agricultural development. There is reason to feel that agriculture will be well supported.

At an early and appropriate time a hearing on the Purnell Experiment Station Bill should be held by the agricultural committee of the House of Representatives. This will give station representatives, agricultural organizations, and others interested in this movement an opportunity to present full information on the work and needs of the experiment stations. The proceedings of such a hearing will be printed and placed before members of Congress. Such a hearing, too, will furnish a basis for discussion and publicity. Up to this time no formal presentation of arguments for

the Purnell Bill has been made. This is a necessary step in the procedure and should have early attention.

The following paper was presented by Edward C. Johnson, Director Washington Experiment Station:

**SECURING PUBLICITY AND SUPPORT FOR THE PURNELL BILL WITHIN THE  
SEVERAL STATES**

**BY EDWARD C. JOHNSON**

In considering legislation which will be of benefit to the Nation's agriculture, one immediately encounters two powerful opposing forces. One of these is the desire for retrenchment which now necessarily is upon us, so that many instinctively look askance at any suggestion which has to do with increased appropriations for any purpose, however worthy. The other is a growing appreciation on the part of the people of the fact that our entire business structure rests upon agriculture, that if this foundation is not sound the superstructure can not be, and that, therefore, everything possible should be done to improve agricultural conditions, not only from the economic, but from the social standpoint. Moreover, recently the Secretary of Agriculture in announcing the appointment of the committee to consider the entire problem of land utilization, emphasized the fact that while our population increases, the land area does not, and that the acreage of improved land per capita has decreased at a rapid rate since 1890. This brings to the thinking man and woman of today the conviction that while we are now beginning to give deserved consideration to the problems of marketing and must give much more, the time is not distant, and indeed is at hand, when the problem of production will demand increased attention so that we may have a foundation upon which an agriculture increasingly efficient from every standpoint can be built.

In proportion as experiment stations are able to demonstrate to those actuated by these opposing forces that they are a capital investment which will yield large returns in better methods of production, in increased production per acre, in better methods of marketing, in better utilization of what the farm produces, and in improved living on the farm, in that same proportion will a campaign for increased Federal funds for experiment station work be effective. In the States, therefore, where the present value of the stations, as well as their possible future value can be most definitely demonstrated, I believe the most favorable publicity and sentiment in behalf of additional funds for experiment station work will be secured. The public and especially those who are primarily interested in legislation must have this matter presented to them in no uncertain terms and in its true light, so that the desire for retrenchment will be outweighed by the recognition of an opportunity for investment that will yield large returns. Unless this condition exists, or can be brought about, there is little hope for any legislation such as the Purnell Bill contemplates.

The first thing that needs to be done in every State, therefore, unless it already has been done, is to take stock of the influence that the experiment station has exerted upon the agriculture of the State. Have any large contributions been made? If so, what are they? Are they such

that they can be evaluated in dollars and cents? If so, what have they been worth? What are the outstanding needs of the State? How are they being met? If they are not being met, why are they not? To what extent would legislation such as is now contemplated make it possible to meet them?

Many stations and colleges already have taken stock in this way. Some of them in connection with their campaign for the State appropriations have made a very careful study of their contributions to the State's agriculture and have summarized and presented this material to many of the leading citizens of the State, including the leaders in farmers' organizations, in bankers' associations, commercial clubs, legislators and through the press, to the public at large. In States where this work has been thoroughly done the foundation for endorsement and promotion of the Purnell Bill has been laid. Where this has not been done it seems to me it is the first thing that should be done and the facts then presented to those who are or should be vitally interested.

In the campaign for publicity and to secure the interest and support of the members of Congress, every State no doubt will have special reasons why the appropriations contemplated in the Purnell Bill should be made and why they would be of benefit to that particular State. In some States these reasons will be easier of demonstration than in others. Perhaps the western States with large areas and comparatively small populations will find it least difficult to prove their point.

In these States of long summers and high temperatures in the valleys, shorter seasons and lower temperatures on the plateaus and in the mountains, great humidity near the ocean and aridity where the moisture is intercepted by mountain ranges, climatic conditions are as diverse as those of the entire Mississippi Valley. Add to this the great diversity in soils, the logged-off land areas with their extremely difficult problems, the additional problems which irrigation brings, the rural social problems in sparsely settled sections, and the great distances from markets, and it is easily realized that every State in the far west has a multiplicity of problems, many of them imminently pressing and a large number of which must be solved locally. These can be handled with reasonable dispatch only if funds much in excess of those now available can be secured. Moreover, the State tax rate per capita in six representative far western States ranges from \$5.53 in the lowest to \$16.50 in the highest with an average of \$9.00, while in six of the middle western States the range is from \$2.75 to \$5.58 per capita with an average of \$4.42. Or to put it in another way, in some of the representative far western States the State tax rate is 3.1 mills, while in representative States of the Middle West the average is 2.21 mills on a 100 percent valuation.

When the great need for investigations and experimental work, as well as the tax rate now existing, is made clear to members of Congress from the western States, many of whom already realize the facts, I have little doubt that the majority of them will be glad to endorse and help secure an increased Federal appropriation for the stations.

In the Middle West and in the East there are other outstanding reasons why this bill should be supported. The great Mississippi Valley always will be the largest food producing area in this country. As such, everything that can be done to make food production efficient, economical, and

abundant, and living conditions on the farm such that a sufficient number of people will be retained in or attracted to agriculture, should be done for that section. It is not too much to say that within the next 50 years it will have a population to feed twice as large as at present. In addition it should have a surplus of food to help supply areas where the population is more dense and agricultural production can not keep up with consumption. Federal appropriations are needed in this section so that continuous and uninterrupted work may be done on problems which are fundamental to the agricultural industry, but which in their very nature can not give spectacular results, or such results as will appeal to the general public. The work will often have to be carried on over a long period of years before results that can be applied in practical agriculture are secured. It is not always easy, in fact it is very difficult, in many States to get appropriations to use for research on fundamental problems involving continuous and careful work over a long series of years. While all of us recognize that these problems are of the highest importance, they do not make the popular appeal needed to secure appropriations for experiment station work.

Many of the eastern and southern States have much the same problems as the States of the Middle West. In some of the smaller States, however, I believe that with an appeal for the increased appropriations, there must go definite plans for investigations along some particular line which will be of service not only to the State involved but to the entire United States. Such work, for instance, as investigations in human and animal nutrition, could be emphasized in one State, tuberculosis in another, abortion in another, the biology of the soil in another, economic and social problems in others, and so on. In this way the smaller States could use their State funds and some part of the Federal funds for work on the problems peculiar to their State and the larger part of the Federal funds for some special investigations which would have a bearing upon the agriculture of the country as a whole. There are plenty of reasons, therefore, why the congressional delegations from every State should be willing and indeed eager to endorse and work for legislation of the nature proposed.

The first organizations whose interest and help in the campaign for publicity and a favorable public opinion should be enlisted are the agricultural organizations, including the local and State-wide associations such as the State farm bureau federations, the State Grange, the Farmers' Union, the horticultural societies, the livestock producers' associations, the dairy associations, the breeders' associations, in fact all of the producers' associations that have effective organizations. A second source of help, and a powerful source, will be the large agricultural marketing organizations. The leaders of these associations, as a rule, appreciate the value of experiment station work and are sympathetic with it and especially with investigations leading to more light on farmers' organized activities, whether they be for production or marketing. The bankers' associations, the agricultural committees of the chambers of commerce, the millers' associations, and other groups also can be of help in many instances. Often they appreciate as quickly as the farmers' associations the great need for the development of our agricultural resources and usually are in favor of measures which will improve agricultural conditions. The State labor organizations also can be very helpful. Some of their leaders appreciate

fully what a smaller production per capita would mean for labor and the well being of our population in general.

The farmers' weeks at the State agricultural colleges held this winter are splendid places for discussing the work of the experiment stations and the relation of the Purnell Bill to them. Many of the leading and influential farmers in every State attend these meetings and if the matter is presented to them they will be willing and eager to support this measure and to do what they can to secure the active interest and support of their representatives in Congress. It will be advisable in many instances, I believe, to arrange special conferences during farmers' week to consider the experiment station program and the relation of the proposed legislation to it. If this were done early in the week and the matter presented later in the week to a general assembly of all present, by one or more of the influential men who attended this conference, I believe it would be very effective help in behalf of the Purnell Bill. In many instances it may be advisable for the president of the institution, the dean, or the director to arrange a conference of the agricultural leaders of the State at the college for the purpose of studying the work of the station from the standpoint of accomplishments, program, and needs. The findings of such a conference will receive wide publicity in the press and will prove of interest to a considerable part of the public. Moreover, on returning home the delegates, as a rule, will be enthusiastic in their support of the experiment station and its work, and if called upon will expend both time, effort, and funds to promote its welfare.

Where conferences of this character already have been held, resolutions adopted, and active work done in behalf of the State appropriations, much of the preliminary work already is accomplished. In such cases I believe it will be necessary only for the director to write a personal letter to those who have been present at the conferences, enclosing a copy of the bill and suggesting active support for it. In the great majority of cases those receiving such letters will be glad to write immediately to their Representatives in Congress in behalf of the bill, as well as to help generate additional interest in their own community. I believe they will be glad of the opportunity to do this even in a year of retrenchment, such as we now have.

The agricultural press is a great source of strength. The editors of each one of the agricultural papers of the State should be visited by the dean, the director of the experiment station, or someone representing the station and the whole matter gone over very carefully with them. In many instances they will be glad to give editorial endorsement of the bill and speak of it in their news items. It is possible, too, that some of the larger daily papers will be glad to give editorial endorsement when the matter has been properly presented to them.

Nor should we overlook the men who are engaged in the game of politics. The county chairmen of both parties and the members of the State central committees can be potent forces if their interest is sought and obtained. Their names can be secured from the chairmen of the State central committees or from the county chairman in the county where the experiment station is located. While many of these men will do nothing in regard to the matter, very few, I believe, will oppose it and a consider-

able number immediately will see the opportunity for a real service and will actively endorse and work for this bill.

Finally, I believe that if action is to be secured in the present Congress, it will be necessary for this group and this association to decide upon a very definite campaign in behalf of this bill to commence immediately. Every State should now be shaping and thinking over its plans. It might be of help to some directors if at this meeting a special committee were appointed to draw up a plan of procedure to be followed in a general way in every State. Such an outline would be helpful in many States and would help to insure active work in most of them.

Finally, it should be remembered that in most States this is an off-year as far as the legislature is concerned and, therefore, a much better year for work for Federal appropriations than when the legislature is in session. In a legislative year Federal and State appropriations are likely to become confused. At such times also one often is fully occupied with affairs of the individual States. For these reasons I think the discussion of this bill at this meeting is especially timely and if capitalized to its fullest extent should bear large results.

The Purnell Bill was also discussed by Dan T. Gray, Director Alabama Experiment Station.

The following paper was presented by E. W. Allen, United States Department of Agriculture:

#### POSITION OF THE EXPERIMENT STATION IN THE COLLEGE OF AGRICULTURE

BY E. W. ALLEN

There are certain conditions and tendencies pertaining to the experiment stations which deserve consideration at this time. They are not all associated with the low condition of their funds, but relate to other features which are quite as fundamental to the growth and success of the stations. Improvement must naturally rest on a clear realization of the situation, and hence warrants plain speaking. The community of interest among the stations is such that what affects a part to some extent affects the whole, especially when the merits and needs of the system are being weighed.

The stations as a group perhaps reached the high water mark as far as support and facilities were concerned as the war came on. Before it was fully realized, this development had been checked. The progress back to normal and to a stage of actual new development has been very gradual, and as yet has affected only a few institutions.

#### MAN POWER OF THE STATIONS

First of all with reference to the personnel; everything considered, it is very doubtful whether the available man power of the American stations has shown any appreciable increase in the past decade, although the quality has improved beyond doubt. Previous to the war there had been steady progress in the idea that the station needed a force of workers specially trained or qualified, who could quite largely concentrate their

efforts on their investigations. As recently as 1917 a committee of this Association on College Organization and Policy expressed the judgment that specialists "should devote their time mainly to one kind of service"—research, teaching, or extension.

The progress previously made in this line has, however, been largely lost. Whereas, in 1914, fully 60 percent of the station employees were free from teaching or other college duties, last year the proportion had fallen to nearly 40 percent. To the extent of 60 percent, therefore, the stations were required to share their workers with the teaching, or to utilize part time teachers. The present year there have been several additions to the station forces, about four-fifths of which, however, have been of the assistant grade, but even of these nearly half are only part time station employees, being connected with either the instruction or extension work.

While, therefore, the colleges have been somewhat more liberally provided with funds for several years past and have been recruiting their forces, it does not appear that much progress has been made in the direction of a specially constituted station staff concentrated primarily on investigation. The reason for this condition seems largely attributable to the necessities of teaching and the attitude of the colleges.

#### STATION STAFF IN PART A MAKESHIFT

This means that after nearly thirty-five years the stations are only in part free to select men primarily for their special line of activity. Quite largely they must share the teaching force of the colleges. They must make the best use they can of such material, whether of assistant grade or head of department. The higher the rank of these dual employees, the more likely are they to have been selected with reference to the work of the college as a whole instead of that of the station. Department heads, for example, are more commonly chosen with primarily reference to administration and teaching, although these heads in large measure determine the strength their departments are to develop in research.

Again the director of the station, even though he is a dean, may not always be permitted to select new appointees for the station. Instances of this have arisen of late in several institutions. The selection has been taken in hand by the chief executive who has gone out to hunt up men and has decided on them without the advice of the director. Similarly, employees have been dropped from the staff without conference with the director, leaving work unprovided for. Such action, of course, will not be defended as good administration, but it illustrates how far the matter sometimes goes.

#### NEED OF CONCENTRATION

I need not enter here into a discussion of the merits of this dual service, but the experience of thirty years has demonstrated that for the systematic prosecution of serious investigation the station needs a force it can depend on, whose attention is primarily in that direction. The present nature of its problems emphasizes this. Two half-time workers, with the distractions they are subject to, rarely equal one whole one, and four quarters mean little more than vacation work for any of them. The claim that men would do better station work if they had teaching has

rarely worked out where the class-room has taken more than a minimum of time. Teaching has the right of way, and except in the larger colleges it fluctuates in amount and may increase unexpectedly. All too often the teachers on the station staff must take up the slack. Furthermore, teaching and investigating are not necessarily compatible; some good investigators are only mediocre teachers, while good teachers may have no particular gift for investigation. The requirements are different.

The stations have spent a great deal of time and money in training men and adapting them to their work—in fitting the kind of men at their disposal for the work required of them. The task has been increased by the employment of men for dual service in the colleges without full reference to their suitability for investigation. It has been a financial strain and a hindrance.

The lack of development in man power, mentioned above, is worth considering in relation to the increased Federal appropriations now being sought. The measure endorsed by this Association would increase the total station revenues fully one-third in three years, even though the present State appropriations or allotments remained stationary. This would call for an increased man power in three years equivalent to some 500 persons on full time. At maturity the measure would fully double the present revenues, without increase in State appropriations, which would mean practically doubling the working force in seven or eight years, or the addition of some 900 persons a year. In the past twenty years, it may be mentioned, the increase in total personnel (about half of whom have been joint employees) has been at the rate of about sixty a year. The question may be asked whether without a change in policy in reference to the stations they are in position to provide for and assimilate new employees at that rate.

#### PROVISION FOR STATION ADMINISTRATION

Turning to the administrative situation, the condition is hardly less one of partnership and divided interest. At present the directorship of twenty-three of the stations is a separate office whose occupant gives primary attention to station affairs. In twenty-five States the office is combined with that of president of the college, dean of agriculture, or director of extension. In six States the dean's office includes the directorship of both the station and the extension service, and in three others the station director is likewise director of extension. In considerably over half the institutions, therefore, including several of the larger ones, the station director has other engrossing duties which make the station management a more or less secondary matter.

Ten years ago the directorship at twenty-nine institutions was a separate office compared with twenty-three at present, so that while the agricultural colleges have been making large growth in size and in the complexity of their work, requiring more administrative attention to the agricultural work, the exclusively station director has fallen into the minority. At some half dozen institutions a vice or assistant director has been provided to help look after details of the station business. This step is a good one, as far as it goes. Thus, thirty of the fifty stations in the Federal group have made some special provision for administering the



station work. It seems to me results have justified the more adequate administrative provision.

#### STATION AND EXTENSION ADMINISTRATION

By way of comparison, it may be mentioned that the extension work in thirty-eight of the States is in charge of a separate officer as director of extension. The salaries for these two classes of directors present quite a contrast. The average salary of the twenty-three separate station directors is \$4,150, while for the extension directors in the same States it amounts to \$4,500. The difference in favor of the extension director ranges, in different instances, from \$300 to \$1,500. Only three of the separate station directors receive as much as \$5,000 or over, while in the extension group \$5,000 or over is a more common salary than \$4,500 is among station directors. These figures, it may be stated, are for the fiscal year 1921 after the quite general increases in the salary rate had gone into effect.

When a college pays its extension director \$6,000 and its station director \$4,500, or \$5,000 and \$4,000 respectively, or, as in the case of four States, \$4,500 compared with \$3,800 or less, the administration of the station can not be said to be rated relatively high. And when half of the separate directors of experiment stations are paid less than \$4,000, there is evidence that a just appreciation of the service or of the importance of the position is quite lacking. How can competent men be expected when new appointments have to be made?

#### STATION DIRECTOR A NECESSITY

Speaking twenty years ago at the semi-centennial of the first experiment station, Dr. W. H. Jordan made this strong plea for the station director: "Above all, I plead for a station director who is that and nothing more. In the multitudinous duties of administration, in the broad relations which he should sustain with the agriculture of the State, in deciding upon the most useful lines of work, in the sympathetic attitude of encouragement, and if possible of inspiration, which he should maintain toward his associates, there is abundant opportunity for the full exercise of the largest ability and the most untiring energy. If there is any official in our land-grant colleges other than the president who should not be halved it is the station director."

This contention has even more force today than it had twenty years ago, because the funds and the forces of the stations have increased greatly and the nature of their work has become far more exacting. With the amount of money which some of the stations are already receiving and the movement for increased Federal appropriations, more adequate attention to the station organization and administration, with a careful conservation of its funds, is one of the first and most important requirements. Wise preparation for larger resources would seem to lie in the direction of strengthening the organization and more intimate study of large questions and the means of solving them. We have the lesson of the Adams Act which fifteen years ago brought an initial increase of only \$5,000, but often found institutions quite unprepared.

## ORGANIZATIONS FOR RESEARCH

The matter of organization is still a very important one for the American stations. Only in part has it been worked out from the standpoint of the highest interests of research. I am confident that it is a no small factor in the efficiency of the stations, and also in the attractiveness of positions they have to offer.

The station organization has quite largely followed the organization of the college departments, built on the basis of the sciences and the broad divisions of agriculture. Such a system is not always suited to the experiment station, and especially the more advanced type of inquiry which now needs to be encouraged. The same reason for rigid adherence to the divisions of science and the subject-matter of agriculture does not apply in research as in the case of teaching. Research centers around problems and ideas, and when an investigator is found with sufficient vision to conduct or direct a well-rounded study, he ought to be free to follow out his reasoning. To only a limited extent, however, have specialists been searched out and appointed with reference to a particular group of problems, because it was opposed to the college scheme of organization.

It is by no means sure that the animal husbandmen as such will play the primary part in working out the theory of nutrition, or the agronomists in determining the philosophy of the use and action of fertilizers. If chemists and nutrition experts and physiological botanists and other specialists are to be brought in, as is quite evident they must be, are these most logically assigned to the animal husbandry department because their work relates to animals, or invariably classified with the agronomists because their studies deal with plants? If so, there is danger that they will be restricted as independent workers, and some of the advantage lost of a larger freedom in stepping over departmental boundaries where necessary.

## DEPARTMENTAL STRATIFICATION

The bringing of all station work under the subject-matter departments usually means more than the association of workers in a given field. It means the administration of all the work of the department as a unit, in the carrying out of which a considerable measure of supervision and control may be exercised. The effect in such cases is to put a premium on administration, sometimes on practical ability, and to place the investigator of creative ability in an inferior position, with considerable restriction on his freedom. If men of high ability in research are to be attracted and stimulated by the station field (and they are the greatest need today), care is needed to avoid any suggestion of stratification within departments which restricts rank or the opportunity of research workers to rise on their merits. Manifestly, also a department which is functioning mainly as a service and teaching department ought not to stand in the way of developing inquiry, or determine the rank and opportunity open to one competent to conduct it.

This is not a theoretical difficulty, but cases illustrative of it are frequent. To cite a case in point, in one institution it has been proposed to take a station department which has long existed independently and has developed along the lines of some of the most advanced inquiry in animal

nutrition, and place it under the college department of animal husbandry in order to carry out the organization plan of the college. This is to be done against the advice of the director of the station and the objection of the specialist in charge, and it has threatened to cripple if not disrupt the special research in that line. At a time when we need so much to get out of the rut of routine and convention in experiment and encourage advanced inquiry, such a result would be a great misfortune. Action of this sort might be misunderstood to imply a subordination of research to an organization ideal.

Elsewhere there is pressure to bring all the station work in the sciences under the direction of the respective science departments of the college or university. Not only would this detract from the independence and responsibility of men capable of independent research, but it would diffuse and dissipate the station effort throughout the institution, increasing the complexities of its administration. Such a step was taken at one university a few years ago with certain of the science departments, embarrassing the station work to a degree from which it has not recovered.

#### THE UNIT OF ORGANIZATION

Of course, I am not advocating a general breaking away from the departmental organization of the institution, but I am pointing to the desirability of some latitude and an administration which will place the station work in the hands of the director. The man and his job may be more important to the station than subservience to a stereotyped form of organization. After all, organization is but a means to an end, and the station's best interests are so important that there should be sufficient elasticity to meet them.

It is worth mentioning in this connection that the college committee report previously referred to recommended that "the individual specialist capable of working independently should be regarded as the unit of organization," and that when these units were grouped to form a subject-matter department, a chairman or administrative head should be designated, in whose selection the specialists composing the department should have voice. This follows the plan of some of the large universities, and it avoids placing administration above all else.

#### THE STATION FUNDS

The serious condition of the station finances has been realized for some time, and as the legislatures in most of the States met the past winter a considerable measure of relief was hoped for. But although very material increases were appropriated by a few States the result as a whole was disappointing.

In thirty-nine States from which returns have been received a net increase was provided for 1922 over 1921 aggregating \$384,000, or an average of nearly \$10,000 per State. (In two of the States included there are two stations, which would reduce the average per station.) Many of the States, however, did not share in this average. The total amount was brought up by five States where the increase ranged from \$25,000 to \$100,000. In about half the States there was no increase whatever, and in only one-fourth did it amount to as much as \$10,000. In many cases the increase

was not more than sufficient to cover the increase in salaries, allowing for no real expansion.

If the past two years are considered, in order to include other States whose legislatures met in 1920, the result is not greatly changed. The net increase for two years, 1920-22, in case of forty-three States aggregated \$965,570, equivalent to an average of a little over \$11,000 annually; but here again the contributions were from a few States, and 60 percent either showed no increase or an amount within \$5,000 a year.

It is evident, therefore, that for quite a majority of the stations no relief of significance has yet been provided, although within the past two years the legislatures in all but a few of the States have met and there have usually been large increases in the appropriation for the college as a whole. In one-fourth of the States the station appropriation amounts to \$13,000 or less; six stations receive no State support.

It may be mentioned that in about a dozen cases the station funds are received in the form of allotments from the college appropriations, the station having no separate budget or means of presenting its needs outside the college authorities. In only about half of these cases did the station receive any material increase in allotment.

#### LOSS OF STATION IDENTITY

Elsewhere I have referred to a loss of identity or individuality by the experiment stations.<sup>1</sup> When the situation is studied broadly I think there can be no doubt that this is the case to a considerable extent. The average station at present is not the definite unit within the college which it once was—a closely organized agency for carrying out the purposes of the Hatch Act. In many cases it is not a department of the college in the usual sense, as the Hatch Act prescribes, presided over by a director with sufficient time and authority to organize and manage its work without interference. It needs a head quite as much as any subject-matter department of the college does.

To a decreasing extent does the station stand definitely upon its own feet, choose its own staff, seek its own ends. In many respects it plays a secondary part, adapts means to its ends, is contingent on the teaching work of the college; if there are few students, workers may be able to do considerable investigating, otherwise investigation must wait. This has been especially true in the past two years. Moreover, the station work is not only being blended with that of the graduate school, but in notable instances its activity in essential research lines is dependent on graduate students and determined by problems which they are interested in prosecuting. Its initiative is gone to that extent, sacrificed to the teaching function.

Several of the stations are losing their publication series; certain of these are being taken over by the college as a whole, and their continuity as publications of the experiment station interrupted. In other cases its long standing circular series is being combined with that of extension and losing its distinctive character. In a number of instances the experiment station has no letter head to identify its correspondence, or is not men-

<sup>1</sup> Experiment Station Record, Vol. 44, No. 7 (May, 1921).

tioned in that of the college of agriculture which it uses. This would hardly happen in the case of the extension department.

#### FUNCTION THE BASIS OF ORGANIZATION AND MANAGEMENT

Expediency has played a large part in determining the fate of the experiment stations, especially in the past few years. It has affected their organization, administration, and personnel, in ways referred to. Sometimes it has determined the amount of appropriation or allotment conceded to research.

The function of the station has not always been so defined in action as to scrupulously conserve its funds for investigation; if it had been, some of these institutions would be more comfortably circumstanced. There is often much latitude in the use of State funds or allotments, which reduces their benefit in a variety of ways. The amounts charged up to the stations do not always represent real money. If these things were deemed necessary when conditions were abnormal, is it not time to realize the effect they have had and to balance the disadvantage? The station deserves considerate protection. Research on the defensive in its own camp should be an anachronism.

As I see it, the situation with respect to these research departments of the agricultural colleges presents something of a contrast to that of research departments in industrial concerns or foundations for conducting and promoting research. The latter have a strong, independent organization, designed to do the special work for which they are provided. The first step is usually to secure a research director, carefully chosen for ability to discharge that particular function, with ample authority and without other conflicting duties. He studies the field and develops a working program; then he assembles a corps of specialists and helpers who give themselves up to their investigations. The chief contingencies are the field and the funds, and these define the effort.

Twenty years ago Dr. Jordan declared that the experiment station "should have a strong, well defined, and independent individuality," and that it was never intended it should be in any sense an appendix to classroom instruction. Today it can not afford to occupy a secondary position or to be contingent on other branches of college activity. Every consideration merits placing it in position where it can determine its own ends and shape its means to those ends. As the most exacting of the various functions of the college and the one most fundamental to the success of all the branches, it needs to be free to carry out its purpose and it deserves to be an object of concern.

The following report was presented by E. W. Allen for the committee:

#### REPORT OF COMMITTEE ON STATION ORGANIZATION AND POLICY

At the convention of the association last year there was presented before the Section of Agriculture a most interesting and suggestive paper on Problems of Agricultural Investigation, by Dr. H. J. Webber. Because of the difficulty of intelligently discussing the paper in the convention or of adequately considering the importance of the points raised, it was referred to the Committee on Station Organization and Policy, and is made the subject of the present report.

With reference to the question of the kind of work the experiment stations should do, the committee is fully in accord with Dr. Webber's contention that the stations are designed primarily to aid the agricultural industry, to help to solve the everyday problems of the farmer, that they should make their work thorough, and that in the end they should, as far as possible, reduce the conclusions to practical terms. Their work should be at the same time both fundamental and practical. This purpose should govern the activities of technical workers, who can not afford to lose sight of it as their ultimate aim or fail to recognize in a reasonable way the boundaries of agricultural science. They will often be led into technical fields where the farmer can not follow and he may not understand the necessity for some of the things they do, but these excursions ought to be a means to an end rather than merely the pursuit of pure science for its own sake.

The stations must help to work out the theory as well as the practice of agriculture. This will often require the study of methods and technique somewhat broadly, and the securing of data of very technical character. We often need to understand the reason for things and the meaning of results, as well as the purely practical deduction. The method of research in agriculture has necessarily become more intensive. The indications are that the public, and especially the farming public, has become more patient with investigation of this type than formerly, provided there is evidence that the worker has his eye on the problem. With the right attitude, therefore, there should rarely be evidence of what Dr. Webber refers to as a "conflict between what the experimenter desires to do and what the farmer requires to have done." To guard against technical work which tends to stray too far afield from agriculture without having the ultimate application definitely in mind, as may sometimes occur in case of workers who have not caught the full spirit of the experiment station, the guidance of the director is important. It is one of his functions to maintain close contact with the station investigations, and he needs to keep informed upon their trend and adherence to purpose. If this is done it would avoid criticism sometimes heard, and it would preserve the use of station funds well within their field.

There is much force in Dr. Webber's caution that care should be exercised in the selection of problems to be studied in each case, so that the station activity may take account of the varying conditions and needs of the State; and his suggestion is a very pertinent one that "every few years a station should carefully consider the problems of the State and determine whether sufficient attention is being given to the most important ones, or whether too much time and money are being expended on problems of minor importance or those the solution of which is not urgently needed for the public good." There have been some instances of lack of studious attention to this important matter, with indications that the limited funds were not always most advantageously employed.

The suggestion is an excellent one, therefore, that an experiment station should inventory the agricultural problems of its State, and should bend its energies toward the solution of the more important of these problems; in other words, that it should have a definite, considered program. It is true, as he states, that "as long as investigators in large measure choose their own problems, more or less of the work will be poorly directed

as far as the solution of fundamental problems is concerned." Clearly, there must be a guiding hand in so important an enterprise, some central authority that looks to the best interest of the station and its effectiveness as a whole. He need not be an autocrat, but he ought to be a student and he must necessarily exercise control over the topics selected for investigation. To quote Dr. Webber's words: "Some one with farsighted vision should have all of the problems of the State under consideration, and look to their ultimate solution. The work must advance according to some broad plan."

It must be admitted, unfortunately, that despite the many years' existence of the experiment station system, a large number of the most fundamental agricultural problems are still poorly understood. Dr. Webber's reference to the matter of tillage is a good illustration. These problems have not been attacked in a way to give more than quite superficial information. The heart of many of them has not been reached, partly because they are so complex and the means have not been found for dissociating the factors they embody, for study separately and in their relation to the subject as a whole. In many cases such study would involve more than a single department and would call for the association of workers.

The suggestion, therefore, that station investigation be more largely organized around problems is one of great importance, which may well command the thoughtful attention of administrative officers. While some progress has been made in that direction, there is much opportunity for expansion. We have as yet hardly learned how to so organize investigation, or the means of maintaining such a union of effort. It is not a simple matter. It depends upon compatibility of those involved, and it requires the maintenance of a bond of common interest. It means much more attention at the outset, and it also needs following more closely than work which is on an individual basis. Unless there is this follow up, contacts are likely to be broken and the work to become so disjointed that it fails of its real purpose. The main tendency in our stations has been to develop departments, following quite closely the organization of the college as a whole, and inadvertently to erect barriers which tend to separate these departments in the attack upon problems common to them. The units have become very large. They sometimes serve to divide interest. Hence their effective union around a general problem necessitates special administrative attention from above.

In pointing to the advantage of teamwork, Dr. Webber rightly cautions against subordinating the individual in cooperative effort. Individuality must be stimulated and fostered in every proper way, for we need independent thinkers. Hence, we must see to it that the individual is stimulated to develop ideas of his own, and that he gets individual credit, for that is a large part of his reward. The suggestion is a good one that problems requiring cooperation for their solution be divided into sub-problems or phases that can be handled by an individual working as an independent thinker, and with opportunity as far as possible for separate publication. In that case the director would usually be the coordinating officer, who would keep before the group the problem as a whole.

The fact that cooperation or coordination has remained to so large an extent a theory, and that the absence of it has resulted in unnecessary

duplication, leads Dr. Webber to suggest a new plan for the organization of agricultural investigation which embraces the two great national agencies, the United States Department of Agriculture and the State experiment stations. This is the real essence of his paper; what goes before is a prelude to emphasize the need he conceives for strengthening and concentrating the attack upon large agricultural questions.

Dr. Webber's thesis is that the present organization encourages each station to feel obliged to work upon the various problems or troubles prevalent in its State, resulting in the scattering of its energies, considerable unprofitable repetition, and a less effective attack than might be made under the "more centralized and combined organization" which he proposes.

For example, a disease like pear blight may receive attention by a large number of stations, each working independently and necessitating a great deal of preliminary inquiry by each investigator, resulting in considerable lost motion, and in the end without any very thorough investigation being done. This leads him to suggest the building up of a group of pear blight specialists who would work more or less together and handle the subject for the entire country without reference to State lines. Such a suggestion appears logical from the standpoint of advancing new knowledge, and it might operate to bring to bear on the problem the most trained and experienced students in that field. But carried out generally, for all the leading problems and branches of research, it would evidently mean a quite radical change in the present organization. It constitutes Dr. Webber's plan for bringing the work of the experiment stations and the Department of Agriculture into closer connection and with greater centralization.

Briefly, his proposals are: (1) That each experiment station become a State bureau of the United States Department of Agriculture, with the director of the station at its head; (2) that the experiment station director plan and direct all experimental agricultural work conducted in the State, in consultation with and reporting directly to the Secretary of Agriculture and the dean of the State college of agriculture; (3) that the maintenance for the agricultural investigation in a State be supplied jointly by Federal and State appropriations, analogous to the plan followed in extension work. The director of the California Experiment Station, for example, would become director of the California bureau of the United States Department of Agriculture. All experimental work in the State, by the station and the department, would be planned jointly and conducted jointly under the supervision of the combined director representing the station and the State bureau, the director reporting to both the local and the Federal agencies. The funds would come from State and Federal sources.

The details of this plan are not amplified in Dr. Webber's paper, and hence the full operation of the scheme is not altogether clear. Evidently these details would form a very large feature of the plan, and after its advisability had been accepted would be relied on to overcome the natural difficulties of such a realignment.

In the opinion of the committee, if the operation of the proposed plan would in any way tend to lessen the probability of the maintenance of the experiment stations as separate units of the land-grant institutions, it would be a most undesirable step to take. The maintenance of the State stations as distinct entities, with their organization, staffs, and environ-



ment favorable to research of the highest possible type, is an indispensable consideration in all plans for the future development of the agricultural research possibilities of the country. The experiment stations which have been established as a result of the operation of the Hatch and Adams Acts constitute one of America's greatest contributions to agricultural organization, agricultural science, and agricultural progress, and their permanency should be carefully safeguarded in any plan for the future development of research in agriculture in the United States. If, however, Dr. Webber's plan contemplates only a closer union or coordination of the work of the State stations and that of the United States Department of Agriculture, its purpose is a thoroughly desirable one.

Such a union of effort is evidently more difficult to accomplish in the case of research than of extension work, because a larger measure of individual initiative along original lines is involved in research than in extension. The work of the experiment station, moreover, has relations to the activities of the college of agriculture and other agencies in the State, and that of the Federal Department of Agriculture has relation to sections of the country or the Nation as a whole. Advice is called for, in the case of both the stations and the department, which entails investigation. There is promotion work to be done, and the basis for regulatory work to be maintained. The fact that the Federal Department must help to settle regional problems, to introduce and establish new industries or branches of farming, to have its own information on plans and possibilities for developing new areas, and in a thousand ways must be in a position to function for the Nation, requires a certain technical force for investigation, and independence of action on large questions.

On the other hand, it is not clear how duplication of work between the States could be prevented without some measure of centralized control or authority, and the plan so far as amplified seems to imply a nationalizing of the whole system. It is proposed, for example, to build up groups of specialists, such as on pear blight, to be located at Washington or some other advantageous point and assigned to the different State bureaus on request. If this were done for "each important problem of general nature," as suggested, it would leave the station forces with relatively unimportant features to work upon, subject apparently to the joint control, as the plan seems to embrace all investigation.

Moreover, the basis of financial support by the Federal and State governments for research work is quite different from that for extension work. The latter provides for Federal aid to extension work in the different States in widely varying proportions and on the basis of practically equal support from State funds; while the former provides a fixed and equal amount of Federal moneys to be expended in each of the States. The Federal funds of the stations comprise relatively a much smaller proportion of the total expenditures for agricultural research in many of the States than do the Federal moneys for extension work. In other words, in many of the States the Federal share in the agricultural research of the station is relatively much less than is its share in the extension service. Hence, a proposal for a centralized, or Federal, control of the agricultural research work might be less likely to meet with popular approval than in the case of extension. This would hardly be satisfying to station men of ambition and ability, and might have the effect of con-

centrating the stronger workers in these groups of specialists. Since the State would look to the outside for the study of many of its large questions, the position of the experiment station might gradually be impaired and the securing of State appropriations made more difficult.

It is with no intention to pass final judgment on Dr. Webber's plan that the above comments are offered, but rather to get at its meaning and procedure. There can be no doubt of the desirability of closer harmony and closer relationship between the experiment stations and the Department of Agriculture in their research. With the general thesis that a way should be found by which these two agencies can correlate their work and conduct it jointly in specific cases, the committee is heartily in accord. The large expenditure involved in agricultural investigation imposes a tremendous responsibility to make the effort as productive as possible, whereas, at present, as Dr. Webber says, a divided front is being presented in many cases.

A closer relationship in the work of these two agencies will involve a more intimate contact between them, an understanding of what each is doing at any given time, and a taking account of this in planning or entering upon new work—a correlation, if you will, a coordination in many essential respects. A division of the field has been found so difficult as to make well nigh impracticable a definition that will not require constant interpretation. Such a continual adjustment calls for close intercourse between those who have the authority to determine policies and to settle programs of research.

The principle of cooperation and coordination is each year becoming less of a bugbear and more fully accepted. Already there is a large amount of cooperative work between the department and the experiment stations. Illustrations of it are found in the work on a number of widespread diseases, such as cereal rusts, the corn root rot, etc. The Federal Department of Agriculture is also utilizing the facilities of the stations to large extent as headquarters and as a working place for its men. This arrangement gives the latter, especially the less experienced ones, an association which is helpful and stimulating to them. The large measure of success in these joint undertakings where the proper attitude is preserved gives encouragement for expansion. There are indications that conditions are ripe for it.

For several years this association has been interested in the proposal for a director of scientific work in the United States Department of Agriculture, and through its Executive Committee has lent its aid and influence in that direction. One object it has had in view has been the development of this correlation of the department's work with that of the stations, the making of research plans which will include the States, although they may be larger than the boundaries or facilities of any single State, the preservation of the local field while working out a research program for some of the larger and more comprehensive problems of agriculture.

Since Dr. Webber's paper was written the provision of such a director of scientific work in the Department of Agriculture has become an accomplished fact. One of the functions of his office is understood to be to coordinate the work of the various department bureaus, to work out a national policy for the department's research activities, to relate and fit it into the local situation where practicable, and to give permanence and

continuity to external relationships. Sooner or later this will doubtless affect the relations with the State stations. The committee believes that the highest interests of research, both national and local, would be served by a plan under which the Department of Agriculture would undertake to conduct its researches in the States in close cooperation with the State stations. If this could be arranged for many of the purposes so well set forth in Dr. Webber's paper would be accomplished.

EUGENE DAVENPORT,  
E. W. ALLEN,  
B. W. KILGORE,  
F. B. LINFIELD,  
E. A. BURNETT,  
R. W. THATCHER,  
*Committee.*

It was moved and carried that the report be adopted and referred to the Executive Body. (For action on its recommendation see p. 353.)

The following report was submitted for the committee by J. G. Lipman, Director New Jersey Experiment Station:

#### REPORT OF THE COMMITTEE ON THE PUBLICATION OF RESEARCH

Most of our scientific and technical journals are now confronted by an unusual accumulation of manuscripts submitted for publication. This condition is explainable on the one hand by the return to normal of the research activities of our experiment stations and the bureaus of the Federal Department of Agriculture. It is likewise to be accounted for in part by the growing appreciation of scientific journals as satisfactory channels for the publication of research. The station directors are less inclined than formerly to depend on technical bulletins for the publication of station research. Both from the standpoint of lessened cost and the more effective distribution of published data the scientific journals have much to recommend them and are accordingly gaining in favor. The time is near when additional scientific journals will have to be provided and the facilities offered by the journals already existing made more ample. Incidentally investigators in foreign countries will turn more and more to American journals for the publication of their research papers.

The Journal of Agricultural Research was made a weekly publication in October, 1921. The size of its page was reduced to that of the Experiment Station Record. Notwithstanding the fact that the journal is now a weekly, the manuscripts already at hand will fill the forthcoming numbers until May, 1922. Manuscripts are coming in in increasing numbers and the editors will be obliged to insist that the papers submitted for publication in the journal be condensed to the utmost and unnecessary tabular material and illustrations eliminated in so far as may be practicable.

Complaints have been received from authors of papers about the present policy of the Public Printer to charge for reprints. The burden of expense thus placed on the individual worker and on the station is an unfortunate one. The original policy of the Department of Agriculture provided that the station in which the paper originated was entitled to three hundred reprints free of cost. The author or authors of the paper

were likewise entitled to one hundred free reprints. Lack of funds for the purpose compelled the department to discontinue the furnishing of free reprints to the stations and the authors. Dr. Kellerman, the chairman of the Editorial Committee, writes in this connection:

"It is my personal opinion that direct financial aid in publishing original research is of the greatest importance, not only to the department workers but to investigators at the State stations. My personal opinion, therefore, is that it would be a wise policy for the department to adopt to frankly subsidize the printing of articles from State stations by a considerable extension of the policy of furnishing free reprints and at the same time establishing the general policy of cooperative consideration of the mailing lists to be utilized in order to avoid any duplication in the matter of distribution. I feel that this will be of greater aid to research in the different State stations than is likely to be at first realized, since many of the smaller stations can not afford to give great attention to the publication of highly technical publications, nor can they afford to look after their adequate distribution to other technical workers. The department, on the other hand, is in a position to provide effective distribution of this character."

During the period October 1, 1920, to September 15, 1921, there were published in the Journal of Agricultural Research 43 papers from experiment stations and 72 papers from the Department of Agriculture, or 115 papers in all. Since the establishment of the journal in October, 1913, there have been published 786 papers, of which 319 have been contributed by the experiment stations and 467 by the Department of Agriculture.

#### RECOMMENDATIONS

Your committee would recommend that provision be made again for furnishing free reprints to authors of papers appearing in the Journal of Agricultural Research and to the stations in which the papers have originated. The committee wishes to express their feeling of indebtedness to Secretary Wallace, Assistant Secretary Ball and Dr. Kellerman for their generous support of the Journal of Agricultural Research.

J. G. LIPMAN,

R. L. WATTS,

W. A. RILEY,

*Committee.*

#### COMMITTEE ON THE PURNELL BILL

On motion of R. W. Thatcher of New York a special committee of five was appointed to promote the interests of the Purnell Bill. This committee as later appointed is as follows: F. D. Farrell of Kansas, chairman, R. W. Thatcher of New York, E. A. Burnett of Nebraska, G. I. Christie of Indiana, J. T. Jardine of Oregon, and Dan T. Gray of Alabama.

#### ELECTION OF OFFICERS

The following officers of the sub-section were elected: F. D. Farrell, Director Kansas Experiment Station, chairman; B. Youngblood, Director Texas Experiment Station, secretary.

WEDNESDAY MORNING, NOVEMBER 9, 1921

This was a joint session of the three sub-sections of the Section of Agriculture, devoted to matters relating to agricultural research.

C. J. Galpin, United States Department of Agriculture, presented the following paper:

**FARM POPULATION STUDIES TO BE CONDUCTED BY AGRICULTURAL EXPERIMENT STATIONS**

BY C. J. GALPIN

**INTRODUCTION**

Whatever doubt exists in the minds of the American people as to the continuing progress of our farming industry, and I am loath to admit that serious doubt does exist, whatever modicum of doubt, however, I repeat, that appears to exist, revolves, in my estimation, about our farm population rather than about agricultural land or plants or animals or mechanical aids to farming.

This confidence of mine in regard to the future of American land, plants, animals, and aids to farming is shared, I think, by the American public; and one great reason for this confidence, I believe, is popular reliance upon the resourcefulness of research and experimentation conducted by experiment stations. America feels equal to its soil problem, because some of its best minds are at work studying our soils. America does not tremble in the presence of its plant pests and animal plagues, because it is armed with an exploring staff of pest and plague fighters. The accumulation of a body of exact knowledge in respect to these factors, in the farming industry, by methods more rapid than experience, furnishes a bulwark of national agricultural defence.

I invite your attention today to a brief consideration of a possible extension of the activities of the agricultural experiment stations, so as to include a study of our American farm population. Would not this new study take out of the American mind that shred of doubt about our farm population and remove, so far as, humanly speaking, is possible, that last remaining fear of the future of the agricultural industry? I will try, in particular, to face first, the question whether there is need of such a study, or, in other words, whether this doubt about the future of our farm population is justified, so long as the experiment stations refrain from a whole-hearted policy of farm population studies; second, whether farm population studies are feasible, that is, whether a body of trustworthy knowledge about our farm population may be gathered, comparing favorably in scientific accuracy, relevancy, and all-round value, with the studies of a purely physical and economic character already so ably conducted by the stations.

**THE LEGAL QUESTION INVOLVED**

One matter should be cleared up at the outset. Under the congressional acts which created and maintain the agricultural experiment stations is it permissible for them to conduct farm population studies? I raise this question for the purpose of quoting from the Hatch and Adams Acts. In Section 2 of the Hatch Act, as you recall, may be found the

following: "It shall be the object and duty of said experiment stations to conduct such other [other than those specifically mentioned] researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable."

In Section 1 of the Adams Act the following words occur: "To paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States."

The only question, apparently, involved in the matter of legality is whether farm population studies would bear "directly on the agricultural industry of the United States."

In this connection, farm population studies as conceived in this paper, will be carefully distinguished from so-called "rural sociological investigations" as popularly understood. The American farm population, interpreted to include its composition, characteristics, relations, and organizations, so far only as it is an influential factor in and bears directly on the agricultural industry of the United States, is here proposed as a subject of study. Rural sociology, as commonly developed, on the other hand, deals with other populations as well as with farm populations; deals, moreover, quite legitimately with farm populations from the point of view of ideal and humanistic development rather than from the point of view of the progress of the agricultural industry.

#### THE NEED OF KNOWLEDGE ABOUT THE AMERICAN FARM POPULATION

There are three main economic, productive, and distributive factors in the agricultural industry, viz., land, capital (plants, animals, machinery), man. Agricultural research has, so far as funds would permit, been freely conducted by the experiment stations in regard to land and capital, and somewhat less freely, but still definitely, in regard to that part of the man factor which functions as "labor" and "management." Unquestionably this procedure has been justified through the years. I need not, I am sure, here sound the praises and repeat the achievements of the stations, in bringing about agricultural progress. I said, in opening my remarks, that the center of doubt in the future of American farming revolves about the human beings doing the farming. Perhaps this was not the case when the soil was more or less unknown, when plants and animals were liable to diseases unknown. But now, when the light shines with a fair ray over these physical mysteries, the farm population, in comparison with plants and animals, presents the unknown and mysterious elements in the agricultural situation. Let me briefly enumerate a few of the blind spots in this situation—spots to be reckoned as blind because of our ignorance of the farm population by regions, groups, or as a whole: First, the *health of farm population groups*, upon which depends not only the ability to produce, but which controls in great measure that important element, agricultural morale—content, courage, vim, self-respect, prestige; second, *stability of farm population groups*, without which the accumulation of economic and social surpluses within the agricultural industry itself is at a minimum; third, *migration from farm occupation and farm life*, either as an overplus or an underplus—a factor about which much is said, little is known, but about which revolves the critical question of a farm population too large, too small, or too depleted in the major human qualities of

economic prosperity; fourth, *types of population groups engaged in various types of agriculture*, with respect to characteristics, racial or conservative or social—an element which is concerned in the fine adjustment of the producer to the product, upon which depends not only an economy of production, but also a social economy of contented workers; fifth, *the standards of a farm population* in respect to (a) *living* (what is known as the physical standard of living), (b) *cultural privilege* (including accessibility to institutions of culture, information, recreation), (c) *political privilege* (especially in reference to appliances of local government)—standards which measure the divergence of privilege and status of the farm population from, or approximation to, the privilege and status of other American population classes; sixth, *composition and characteristics of farm population groups with respect to tenure status* (laborers, tenants, owners), upon a knowledge of which depends, not only the adjustment of labor supply to production, but also the economic promotion of members of one status group to the next and the replacement of one type of population group by another type; seventh, *psychology and ideals of population groups*, upon a knowledge of which depends the scientific adjustment of the agricultural extension work of the Nation, as well as the rapid progress of the cooperative movement in spirit and in technique.

Looking forward to the development of the agricultural industry in the next fifty years, I ask you whether agricultural progress is not in the balance with respect to the future of the farm population just as human beings. Will the scales tip toward a smaller farm population of high qualities? Will they tip toward a larger farm population, but of lower caliber, lower standards of living?

If you hold to the much vaunted "American standard of living" for the farm population, and you would be brave indeed to enunciate a lower standard, you face the likelihood of being obliged to fight for this standard against the cry of the city for cheap food, cheap labor, large, cheap production. In this fight, will you not need the facts about your farm population with which to fight your case? If there is ahead a turn in the road of some kind for agriculture, as many believe, is it not likely that the human side of farm life will be found facing the turn and bearing the brunt of the new era?

The need, therefore, of research on farm population is, theoretically speaking, based upon the indisputable facts, first, that the farm population is one of the major factors in the agricultural enterprise; second, that as a piece of logic it is no less uncertain, no less questionable, to assume conditions about population, than about the other economic factors. The need of studies on the other hand, practically speaking, is that the time is now critical with regard to farm population, and the Nation wants to know what is the efficient type of farm people—of farm community, of farmer organizations, of farmer status, what is the efficient number of the farm population required to keep national welfare at high pitch. Such a practical matter can be decided only by study of the groups of human beings themselves, and not by juggling perfectly good statistics of land, crops, credits, prices, markets, with a supposititious, hypothetical, or mythical farm man, or labor unit, or farmer class.

## THE FEASIBILITY OF SCIENTIFIC STUDY OF FARM POPULATIONS

By way of introducing this part of my paper I call to mind the fact that the United States Census, in its decennial reports, presents a statistical study of the population of the United States as a whole with respect to a few certain facts. You will recall also that the Census Bureau in these census studies and statistics has not seen fit as yet to give the composition, characteristics, and relations of our farm population as a class, although the 1920 schedules do contain for the first time the necessary facts for such tabulations. But the assumption of the Census Bureau is that scientific study may be made of any population group of the United States.

I recall to mind also that Roosevelt's Country Life Commission, in 1908, of which Dr. Liberty Hyde Bailey was the distinguished chairman, assumed, in its famous report, that a scientific study may be made of farm population groups, whether these groups are economic or social, and, furthermore, took for granted that such studies bear directly upon the progress of the agricultural industry and the upbuilding of a strong national life.

May I present the feasibility of the scientific study of American farm populations, under two heads? First, that of original research or study of population phenomena as presented in every day life; second, as presented in experimental situations, i. e., situations of a more or less artificially stimulated or controlled set of conditions.

*Study of every-day population phenomena.* The question before us is how feasible is the scientific study of farm population phenomena.

(1) Intensive studies of small units of farm population, can unquestionably be made by and through the experiment stations at very reasonable cost, following out the scientific methods of the census. Until the United States shall see fit to issue a volume on farm population comparable with the volume on agriculture or that on population as a whole, the experiment stations might very well request the privilege of the study and tabulation at the Census Bureau of certain units of population in each State by use of the census schedules.

(2) As examples of studies of farm population made by the inductive method which arrive at important and recognized results, I wish to offer as exhibits three bulletins: Research Bulletin, No. 34, "The Social Anatomy of an Agricultural Community," and Research Bulletin, No. 44, "An Analysis of the Occupancy of 500 Farms.—A Study in Farm Tenancy," published by the Agricultural Experiment Station of the University of Wisconsin; and U. S. Department of Agriculture Bulletin 984, "A Study of Migration from 927 Farms during 100 Years." These studies have received recognition by eminent economists and sociologists as representative examples of scientific research on the human, social side of farm life. The costs of these studies were no more than the costs of experiment station research studies on plants and animals.

(3) Standard health studies have already been made of certain farm population groups by the United States Public Health Service, viz., "Rural Sanitation, A Report made on Special Studies in 15 Counties," Bulletin No. 94; Rockefeller Institute for Medical Research, Monograph No. 15, "Investigations on Soil Pollution" . . ., by I. J. Kligler. Such studies, and a



far-reaching extension of such studies, can be carried on by public health specialists in cooperation with directors of the experiment stations. The unit measures of public health are worked out with a considerable degree of accuracy, so that health surveys of communities, and counties and even regions can be made as satisfactory as similar studies of cattle, orchards, and grains. Health studies in regions of low production will fit in with other studies of factors of low production.

(4) The farmers' standards of living in America are susceptible of study. The methods and measures of living conditions, and the approved standards have already been worked out and applied to city living conditions. For example, a study of housing of farm people can be made and presented in very definite and accurate form. The grades of farm houses with respect to number of rooms, cubic feet of space, amount of light, ventilation, heating, conveniences, sanitation, etc., are easily fixed and applicable to various regions. The standard of food, clothing, recreation, education, etc., may be reduced to measure and to determinate figures. The major institutions of farmers are now subject to measure, gradation, and efficiency tests of a practical nature. These may be studied historically, their utilization compared, year by year, or region by region.

(5) The privileges conferred by local government upon municipalities of farmers admit of exact description and geographic representation. The efficiency of farmers' local government is obtainable through the comparison of tax records, budget costs, and services rendered. Only scientific investigation can determine how the farmers' appliances for local government compare with those of the villager, or townsman or city man within a particular county. The question of discrimination against the farmer in such matters is determinable in statistical form.

#### EXPERIMENTATION

Let us turn now to the feasibility of experimentation. Experimentation in the improvement of population groups so as to increase the agricultural industry, is a question that you of the experiment stations will desire me to comment on. Is an experiment in population possible, or feasible? Within certain limits, I believe it to be quite feasible. In fact, I believe that within the borders of many States there are certain experiments of a partially controlled character, which offer opportunity for study, such as: (1) State immigration bureau control, which assists settlers to new lands; (2) colonization plans, as in California, for example, which selects its elements in certain population groups; (3) real estate and colonization company plans which induce, select, and locate elements; (4) state employment bureau plans which place laborers in population groups and mobilize seasonal labor. All these furnish experimental situations tending to change population groups and are susceptible of observation and study as if they were in the laboratory.

Each State can select for itself a certain population group, viz., so many contiguous farm families possessing a certain group characteristic (such as race or type of agriculture or institution, or type of land tenure, disease condition, or trading agencies in common). Agreement may be made with this group by the State college for the introduction of some group practice, institution, or enterprise, calculated to remake the popula-

tion group in some respect. The thing introduced will be under the control of the experiment station, just as a feeding experiment with beef cattle is under control. As examples of such a "practice" let me suggest the following somewhat at random: The agreement to go after, in a group way, good farmers to enter the group (tenants or owners) as opportunity arises for renting or buying (just as city communities go after energetic business men to locate a business); employment of a music master for the communities—this being furnished from the State university or the State college; the operation of a general health measure; keeping daily records of leisure and labor. As examples of an institution may be cited the building of a specified type of community house, with specified utilization; the organization of a library, specified and under specified use; the introduction of a farmers' club, or a community fair, or an annual play day. As an example of an enterprise, may be cited a recreation enterprise—movie, baseball league, camp, Chautauqua. Measurement of results in the community or group are all possible. The precision of mathematical science will not be required, surely in claims for scientific accuracy, in matters of a non-statistical character.

Certain ideas may be given currency through a systematic program of publicity within a population group, as an experiment pure and simple, without the knowledge of the group that it is experimental. The results may be measured, as a means of changing organization. For example, observations can be made on the action and reaction in a health campaign with respect to care of bodies; an education campaign with respect to a consolidated school or high school; a church-consolidation campaign; a co-operative laundry campaign, etc. Groups may be persuaded to take advantage of certain laws, such as the Wisconsin Community House Law or the North Carolina Rural Community Law. These can be legislative experiments, induced, controlled, watched, measured.

#### CONCLUSION

I believe that favorable action on the part of experiment station directors, legitimatizing research on farm population, will have a profound effect finally upon our national agricultural policy. Hope that our farm population groups can be re-made, just as we have hope that our cattle groups can be bred up, will put new spirit into agricultural and country life workers.

It is not necessary to dabble in eugenics, strictly so-called, to accomplish the task of re-making or replacing population groups. Various methods of re-making are well-known now, such as, by migration, by immigration, by the youth of the group coming to majority and power approximately at the same time, by the introduction of dynamic institutions, by disintegration of groups, by closer integration of groups. If farm people themselves knew more about the farm population and its grouping principles, they could take a hand in controlling somewhat for the good of agriculture, these group changes.

The adjustment to agriculture and to agricultural life of groups of people who will do well at the job, who will flourish as human beings in the job, is certainly well worth while on the part of extension forces when founded upon the facts as made known by systematic research.

This human side, this population side, this so-called idealistic side of farm economy has many intricacies and labyrinths which, so long as they are unknown to agricultural scholars, to agricultural statesmen, and to the farmer thinker, will serve to prolong the period of waiting for great agricultural progress.

This means, of course, that research in the lines of production, markets, prices, credits, will not receive the full reward of achievement until research on the human side reaches its goal also. I believe, gentlemen, that in your hands today rests the chance to give a new and mighty impetus to American agriculture.

The following paper was presented by R. W. Thatcher, Director New York State Experiment Station:

#### AGRICULTURAL RESEARCH IN RELATION TO THE PUBLIC WELFARE

BY R. W. THATCHER

With your permission, I should like to introduce this paper with the following quotation from a recent address by Dr. Angell, the new president of Yale University and the former chairman of the National Research Council:

"Nothing can be more certain than that the character and rapidity of our national development in all matters which relate to industry, agriculture, public health and the preservation of the physical framework of our civilization will be dependent upon the quantity and quality of sound research which is carried on. The truth of this assertion becomes even more apparent when one recognizes the fact that every modern nation stands in relation of industrial and commercial competition with other nations and in the measure in which this is true, to fall behind the others in scientific development is to precipitate a trend of events which spells national depression and disaster. In other words, the price of a sound, comprehensive national life is, in these times, widespread and intelligent scientific research."

Thoughtful men everywhere are of the opinion that in agriculture, as in almost every other form of industry or of human endeavor, we are at the most critical period in our Nation's history. For the past twenty years it has been apparent that our growing population is rapidly overtaking our normal production of food and fabric materials. The war emphasized anew the importance of the products of the soil to the national existence. The reconstruction period is presenting its usual problems of adjustment of agriculture, industry, transportation, and commerce to normal living conditions after the upheaval of the five-year period, when every normal process of peaceful constructive effort was overturned in the mad orgy of destruction of life and property. When we get through this trying period and the whole world gets back to normal conditions, we shall find ourselves confronted with problems the solution of which will tax every bit of energy and ingenuity which we possess.

This condition ought not to cause us dismay. If the war taught any lesson at all, it certainly taught that of confidence in the power of America to meet any emergency that may arise. The outbreak of the war found us, thank God, almost wholly unprepared for war. As a Nation we were lovers of peace, loath to quarrel with our neighbors, bending all our ener-

gies to the arts and sciences of peaceful, constructive, productive industry. But when war was thrust upon us, with what marvellous rapidity and energy did we transform our factories, our young men, our government, in fact our whole national life into the agencies of war. A few of our citizens rebelled against this change, but these were only an insignificant minority who were soon won over either by moral suasion or by legal coercion, and shortly we presented an undivided front to the foe and in a single short year converted our entire peace-loving and constructively industrious nation into a great fighting machine. There were, to be sure, some mistakes and some disappointing failures; but the total result was almost inconceivably successful, and men, munitions, food and every other agency needed for the prosecution of the war began to pour across the 3,000 mile gap between us and the fields of Flanders in such a flood as the enemy nations, and even we ourselves, had believed to be impossible.

If America could thus meet the needs of the war emergency, the task which of all others we loathe and despise, with what confidence may we not approach the task of peace-time reconstruction, the renewal of the harmonious constructive development of a Christian national life to which our past century and a half of history points the way. As scientists, we return again with the utmost of pleasure to our conception of science as the servant of peace, health, and happiness, rather than as the demon of destruction.

At the close of the Civil War, the Nation was confronted by a similar problem, with the added difficulty of a divided people. But a few short years sufficed to bring our people into harmonious effort and to usher in a period of industrial and social prosperity which has no counterpart in the world's history. Now we face the reconstruction period with no serious division of our people and with the certain knowledge that our minor divisions into economic or social classes can always be forgotten in a united effort for the Nation's good.

But, agriculturally, we face quite a different condition now than we did at the close of the Civil War. Then, it was only necessary to occupy the new and fertile lands of the western prairies in order to produce all that the Nation could consume or export of the products of the soil. Now, we have come to a new era in our national life. We have passed the period of exploitation; our problems now are those of careful scientific development of the possibilities of increased production and of proper utilization of the products of our nearly fixed acreages of agricultural land. Hence, now is the time for taking stock of our agricultural situation, and now, more than ever before, is the need for careful scientific study of the multi-fold problems of our agricultural policy clearly apparent.

At the close of the World War, the outlook for research in the United States, both as to its immediate future and as to its permanent place in our economic structure, was very rosy. The tremendous part which the results of new discoveries had played in the conduct of the war had attracted popular attention to and support of research activities. Research men had themselves received new impetus and enthusiasm from the practical benefits of their work which were made manifest both in the prosecution of the war and in the sustenance of the people of the warring nations, whose normal productive energies were being diverted to war purposes. Organization of research agencies and the general recognition of the pos-

sibilities of cooperative attack upon the problems which need scientific study seemed to promise much for the success of research work in the immediate future.

All of this seemed to be particularly true of research in agriculture. The vital importance of the products of agriculture to the national security had been emphasized again by the war-time needs and slogans. The new generation of captains of industry and of statesmen, who had not been through the experiences following the Civil War and who had been so engrossed in industrial development as to give little heed to the importance of a sound and permanent agricultural system, had been brought face to face with the absolute necessity for a sufficient supply of agricultural products for the world's needs and to a realization of America's strategic position as a food-producing nation. On every hand, there were heard assuring statements of the recognition by our leading men of the importance of the development of a sound agricultural policy, including ample provision for continuous, careful, scientific research into all the possibilities of improvement in agricultural production and in the conditions of rural life.

Just now, however, the expected impetus to public support for agricultural research seems to have been temporarily thwarted by the business depression of the reconstruction period and by the popular clamor against increased expenditure of public funds. Every thoughtful American citizen approves of the reaction against war-time extravagance in expenditures; but every hopeful, loyal American looks forward to the return of the sense of responsibility for public welfare, which just now seems to be subordinated to petty political jealousies or to selfish personal political ambitions. If history teaches anything at all, we may be sure that present conditions are absolutely un-American and, therefore, only temporary in character.

I believe that we ought not to be discouraged or dismayed by the present apparent relaxation in popular enthusiasm for agricultural research work; nor should we mistake it to be any definite or permanent opposition to our work. During the days of more or less haphazard development of our national agricultural policies prior to the war, our agricultural experiment stations and the research work of the United States Department of Agriculture received such generous support as to develop them into agencies for research which are the marvel and the example for the whole civilized world. Now that the lessons of the war-time emergency have so emphasized the importance of agriculture to the national life and now that we are entering upon the necessary period of careful development of our agricultural resources, as contrasted with the reckless exploitation of the past, we may confidently expect increased public support for the work of these great agricultural research agencies.

But such support must be based upon a real understanding and genuine appreciation of the part which research can play in the development of a sound national agricultural policy. The ease with which appropriations for agricultural research was secured during the period before the war was in part due to the general state of public affairs. Exploitation days are always days of easy money—easily obtained and easily spent. Development days call for wise and careful planning and purposeful expenditure of effort and money. Hence, there is laid upon those

of us who, by our engagement in public service for agricultural development, have a unique opportunity to mold public sentiment, the responsibility to see to it that the proper place of research in relation to sound agricultural development and the general public welfare is clearly understood and fully appreciated. If we properly perform this duty, the future of agricultural research in this country is assured.

The fundamental place of agricultural research in any system of agricultural education and development is so apparent that it needs no elaborate discussion or argument concerning it. It is an old and trite saying that "no stream can rise higher than its source." And it is a self-evident fact that the source of agricultural knowledge is careful scientific investigation of the laws of nature. There is, however, need for a clear understanding as to just what research work is. One phase of the present agitation against large public expenditures is a demand for so-called "practical results" from them. This is an inevitable and altogether wholesome reaction against extravagant war-time expenditures. I hope that it may continue and that no object which does not promise definite improvement in our general living conditions may successfully appeal for financial support. Our expenditure of public funds for agricultural research must always have as its proper justification the accomplishment of some definite "practical result" in agricultural education or practice. But this does not mean that our research must always deal with a method of farm operation. Most, if not all, of our experiment station researches ought to deal with some principle which is definitely connected with agricultural practice. Agricultural science is nothing else than those aspects of natural science which have some application to agricultural practices. But I do believe that it is essential that our investigations shall be undertaken chiefly for the sake of ascertaining the fundamental scientific principle involved; rather than simply the finding out, by some plat, field, or laboratory trials, of the comparative value in terms of increased yields or improved quality of the resulting products of possible different ways of growing crops, of breeding animals, of manufacturing dairy products, etc. In short, the object of our investigations should be to discover the "reason-why" rather than the "way-how" of agricultural practices. It is clear, I think, that the results of any determination of the "reason-why" can not fail to point out the right or wrong way to do the thing itself in actual farm practice. On the other hand, a simple experimental determination of the comparative economic returns from two or more different methods of performing any detail of farm operation yields only purely empirical knowledge, the value of which may vanish with slight changes in economic or environmental conditions.

The members of any experiment station staff may become well-known authorities concerning practical farming operation in their particular fields of agricultural production and be able to give immensely valuable advice to farmers; but this is a result incidental to, rather than the object of, their scientific studies. The public welfare is doubly promoted by research work which is properly directed and carried out, since it results both in the establishment of a permanent working basis for sound agriculture and in an immediate improvement in agricultural practice.

It is easy to cite almost innumerable examples of the "practical results" of agricultural research. The Nation is today richer for the

thousands of new varieties of farm crops which have been created by scientific breeding, or introduced from other countries since the workable knowledge of the relation of plants to their environment has been secured. Corn is grown more than 300 miles further north than it was believed to be possible; alfalfa is profitably grown over vast areas which were formerly destitute of a leguminous forage crop; fruit raising is a profitable industry in many localities where only the hardiest of native fruits grew; systematic breeding of animals for increased production of meat, milk, eggs, etc., has raised animal husbandry from a haphazard industry to an art which is producing wonders that were inconceivable a few years ago. Scientific research workers have discovered methods of control of insect pests and plant diseases which have changed the production of plants and animals from a blind trusting to Providence that each individual may escape or survive the attacks of its enemies, to a systematic and regular maintenance of the health and sanitation of agricultural plants and animals which is little, if any, inferior to the safeguards which are now thrown about human life. Our food supply is now guarded almost as zealously against the attacks of parasites as is our bodily health. The Babcock test and modern creamery and cheese factory practices are the results of station research. The list could be extended almost indefinitely, to show that "practical results" have been obtained from the scientific research work of men who may have had little personal knowledge of practical farm operations, but who have had the skill which comes from thorough scientific training. I need not take the time here to extend the list to include numerous other examples which are familiar to you all. I have planned in this paper to cite the fundamental logic which lies back of the maintenance of agricultural research as a public policy, rather than to indulge in the more usual (and perhaps more effective) method of dwelling at length upon the economic advantages to the general public of the results which have been secured in the past, or promise to accrue in the future, from publicly-supported agricultural research.

There are three general types of work which may properly be undertaken by the scientific staff of an agricultural experiment station, all of which are capable of adding to our store of fundamental knowledge of agricultural science and practice.

There is, first, the endeavor to ascertain what are the scientific principles back of certain farm practices which are known to be correct because of their long continued use by successful farmers in many localities. For example, it has been known by livestock feeders everywhere, for generations past, that certain so-called "succulent" feeds, notably the root crops, product beneficial results when fed to animals which are all out of proportion to the total amounts of digestible nutrients which the materials contain, as shown by the ordinary chemical analyses of the feeds and of their undigested residues after feeding to the animals in question; and, on the other hand, certain other feeds which on analysis showed the proper kinds and amounts of nutrients for a so-called "balanced ration" have been known by practical feeders to be altogether unsatisfactory for the exclusive diets of farm animals. Recently physiological chemists, proceeding from purely theoretical grounds, have been able to hypothesize an explanation for these known facts, on the basis of the so-called "vitamines" or "accessory food substances," which appears now to have ample weight

of experimental evidence in its support, and to be likely to influence profoundly the practical nutrition of both animals and men in the future. This familiar example shows how a search for an explanation of well-known facts may lead to knowledge which will profoundly affect future practices.

In the second place, there are a considerable number of agricultural practices based on long experience concerning the wisdom of which more careful observation seems to throw considerable doubt. These clearly ought to be subjected to critical examination by skilled operators who are qualified to observe correctly the conditions under which the crop or animal is making its growth or the process is being carried on, to analyze accurately the cause and effect relations which are involved, and to reason clearly to a final conclusion as to the wisdom of the practice in question. As examples of this type of problem for research study, there may be cited the practice of growing grass as a "sod-mulch" in orchards, which seems now about to be conclusively demonstrated by certain of our bacteriologists to be wrong in fundamental principle; or, the general use of fertilizers of a given type on a given soil, on the grounds that fertilizers are supplied to make up soil deficiencies, whereas recent investigations seem to clearly show that the crop's needs at various stages of its growth are a much more rational and economical basis for fertilizer practice than can be found in any study of the soil itself; or the foolish attempts on the part of many enthusiastic residents of a given locality to perpetuate in the agriculture of that vicinity certain crops or animals on the grounds that the soil of that locality is able to produce the crop in question, or that there are no limits to the types of agriculture which that particular community will support, when a simple economic study shows that the community would be vastly better off if it would swallow its local pride, admit that certain agricultural products can be produced better elsewhere and confine its own activities to those agricultural practices in which it has unique opportunities to excel.

Finally, there is the whole realm of new problems in the application of scientific principles to agricultural practice. Meteorology, for example, can not fail to have many vastly important contributions to make to the success of that vocation which, more than any other, is dependent upon the weather for its outcome. Genetics is already contributing both working bases and individual brilliant examples of the development of new methods of agricultural practices resulting from the application of scientific principles to the breeding of economic plants and animals.

The older sciences are themselves being so changed by modern study in them that they offer constantly increasing opportunities for new attack upon agricultural problems. New ideas and new methods which will serve to increase our knowledge of agricultural science are almost without limit. Examples of past achievements in this field of research and citations of future possibilities might be multiplied almost indefinitely.

For the purposes of this paper, however, I wish only to add that it would seem that the most striking new possibilities in this direction are opened by the new conceptions of cooperative attack upon research problems which are now gaining so much favor. To use a militaristic metaphor, we may say that whereas, in the past, the line of attack upon the field of the unknown which lies beyond the borders of human knowl-



edge has been advanced by occasional brilliant sorties by individual daring spirits, whose efforts have resulted in jutting salients exposed to attack from all sides except the rear, now there seems to be the possibility of great mass attacks all along given sectors of the line, with the geneticists, the chemists, and physiologists supporting the flanks of the crop breeder; the entomologists, the pathologists and the soils expert cooperating with the horticulturist in his advance, etc., etc. Such cooperative effort ought to insure permanent gain along the whole line rather than salient advance positions which are difficult to attain and hold.

In these discussions, I have dealt thus far exclusively with the possibilities of the application of the natural or physical sciences as the agencies for agricultural research. There can be not the slightest doubt that equal, or possibly even greater, opportunities for contributions of research to the public welfare, so far as the latter is dependent upon agriculture, lie in the fields of the applications of the economic and social sciences to the progress of agriculture, both as a business and as a mode of life. It would lead me too far afield to discuss today, as I have done on former occasions of this kind, the possibilities and methods of research in these fields, which require studies of the human and social elements involved in the business of managing a farm and disposing of its products and in the rearing of a family on the farm as a home. I think it will be sufficient only to call attention again to the fact that many problems of this kind have been presented to this body during recent years, by such eminent statesmen as our honored Secretaries of Agriculture and by economists and social workers of world-wide renown for their scholarly thinking, their broad vision, and their humanitarian impulses.

It may be considered as perfectly apparent, then, that agricultural research is of the highest importance to the public welfare from the standpoint of its contribution to the economic prosperity of the Nation. I believe, moreover, that it could be shown, if time permitted, that agricultural research has a very important contribution to make to the intellectual welfare of our people. In the past, it has been held by many scholars that research, to be highly intellectual, must be free from the taint of possible economic application or the possibility of commercial utilization. "The search for truth for truth's sake" has been held to be the real intellectual basis for research. But it now appears that the dilettante groping about in the dark of nature's mysteries in the hopes of stumbling upon something that will arouse a thrill or stimulate curiosity or interest is no more an intellectual operation than is a carefully planned attack upon a problem which has a definite economic bearing, but which requires for its solution just as keen an imagination, just as careful and painstaking training, and just as skillful and daring execution as does the older type of so-called "research in pure science." There can be not the slightest question that the discoveries of the laws of nature which manifest themselves in the growth of cultivated plants and domesticated animals are of the same order of intellectual value as are those which are manifested in wild life. It often requires a higher degree of intellectual attainment to comprehend the working of these natural laws when under the influence of artificial environment than when under natural conditions, but this does not indicate a higher intellectual value in the appreciation of either the one or the other set of natural phenomena. I am positive that the whole field of

human knowledge is the richer for the contributions to it which have resulted from researches which had a definite economic end as their chief object; but which incidentally contributed much to our knowledge of the physical laws of the universe.

Finally, I believe that it can be shown that agricultural research contributes to social welfare. By this, I do not mean the improvement in social conditions which is made possible by increased economic returns from farm labor, but rather the higher type of living in a farm home which results from better intellectual understanding of nature's laws and operations. I believe that there is actually a higher social life imparted to him who through study of nature as she unfolds her secrets to him under his sympathetic study and on his home farm gains a new attitude toward his life work. The results of research which bring to the man who lives on the land a fuller appreciation of nature's wonderful handiwork can not fail to arouse in him higher standards of life and better hopes and aspirations and so to make a better social being of him. There is an old saying that "the good men come from the farms" and another that "country life is the cleanest life." Students of sociology tell us that there is a real element of truth in these ideas. Nothing is clearer than that unintelligent life on the farm reaches limits of squalor and degradation which are hardly to be found elsewhere. On the other hand, the intelligent, active, broad-minded men who live on so many of our American farms are the bulwark of our national social life and standards, and the contribution which research makes to the elevation of their moral and social standards of life is a real item in public welfare.

In conclusion, I wish to point out that the relation of agricultural research to public welfare is a reciprocal one. Each should promote the other. We who believe in the possibilities for good from our research work ought to endeavor to make sure that the general public appreciate the advantages which they enjoy as a result of our services; but we have a right to expect the public to meet us half way in our efforts toward mutual understanding and mutual support. I believe, therefore, that we ought not to hesitate to solicit every possible form of public interest in our work. That we want the moral and financial support of the public for our stations goes without saying; but in addition we ought to invite and welcome constructive criticism, friendly suggestion, or any other evidence of public interest in our research work.

To this end, we should be willing at all times to recognize our responsibility as public servants to present our plans for the work of our experiment stations before the public in definite form, in order that we may have the intelligent assistance of those who understand and appreciate agricultural research in securing public support for it. Also, we ought to desire and invite the assistance of individuals and of organized farmers, both in the way of friendly constructive criticism of investigations which are already in progress and as suggestions of new research work which is needed in order to promote the development of the general agricultural welfare of our State and Nation. If we succeed in establishing this friendly working relationship with our agricultural constituency, we will have developed a most powerful agency for the promotion of a wider and more general recognition of the real value of agricultural research to the general public welfare of our country.

E. W. ALLEN, United States Department of Agriculture. Knowledge is the chief limiting factor in human development. It is the great source of power—to the individual and to the State. It is the means by which civilization has made its most substantial advancements. Research is the process by which information of exact character is acquired. The term is used in a broad sense, as the quest for knowledge, the means of advancing from what is now known to that which is yet unknown, through the method of science.

The scientific method is characterized by the account it takes of all the forces acting in a given case, and attempting to isolate the causes and express their relations to the effect. The conscious or unconscious recognition of this cause-and-effect relationship, which is the process of science, is the chief difference between modern civilization and that of the days of superstition. The unscientific peoples are without large influence in the world because they are lacking in creative ability. They may exhibit aggressiveness in a warlike spirit, but they are deficient in the elements of resourcefulness which enable progress in material affairs.

These things are as true in agriculture as in other branches of human welfare. Agriculture, of course, is much broader than farming. It concerns the means by which the people are fed, only a fraction of whom are food producers; and it is the basis of practically all industry. Without the products of agriculture there would be little manufacturing or commerce. The farming people are only one group of those dependent upon agriculture and benefited by its advancement—a small fraction of those whose business and comfort and even life depend ultimately upon it. Production and distribution of agricultural products are so vital that a high degree of efficiency is vital to public welfare; and this proficiency must be progressive. Without this element of progressiveness and the means on which it rests, agriculture would soon become inadequate to the needs of increasing population and the growth of other industries. Agriculture is so fundamental to every day life and to all industry that anything which benefits it permanently is a contribution to public welfare.

But the practice of agriculture has not within itself the necessary elements of growth, the ability to make steady progress in gaining control and maintaining dominion over the elements and the forces of the earth. Alone, experience is a slow and blundering method of gaining necessary information in new lines. With no disposition to minimize its importance, it is manifestly only one source of knowledge; and until its correct meaning has been learned it has often been a source of grave error. It may perpetuate the mistakes of the fathers. If we relied entirely upon it today our agriculture would be in the Middle Ages and of course would be wholly inadequate.

When a people try to advance along a new line, or do something which has not been done before, or to meet new conditions, they must go outside the range of human experience and develop new information. If a new disease appears on a crop or a new condition in the soil it is not noticed by the average farmer until it attains considerable proportions, and unless there is information to suggest what to do about it, it must be left to run its course. New ventures in any agricultural line do not advance far before questions and difficulties are encountered which can neither be answered by experience nor common sense.

It is quite common for the public to attribute the conspicuous advances in human progress to invention. The popular impression is that it is only necessary for some inventor to conceive an idea, and Behold! a new instrument or means of procedure embodying a new principle springs forth full grown! While fully acknowledging the large debt we owe to invention, it needs to be understood that, except for certain ingenious mechanical devices, few lines of effort have been more dependent on research than invention. Instead of leading the way, it waits upon the development of scientific facts and principles which inventive skill may harness or apply in a mechanical way.

The popular saying that "necessity is the mother of invention" is only half true, for no amount of necessity results in an epoch-making invention until the way for it has been prepared by the discoveries of science. We have only to remember how long the necessity usually existed before it was satisfied by the invention. Necessity has stimulated men to attempt to satisfy their needs, while science and research have pointed the way. The latter are far quicker in their response to the need, as the war illustrated in innumerable ways. Moreover, science often anticipates necessity and tries to keep ahead of it. Invention is the child of science.

The research product of our experiment stations is not thought of as invention, even though it represents a new method, a new device, or an improved plant. If these were patented there would be quite as striking "inventions" emanating from the experiment stations as now pass through the Patent Office.

There are two general classes of benefit from research, (1) the direct and immediate application of its results to the arts of life and to the comfort and well-being of the people, and (2) the effect of the accumulation of research in training students, giving a sense of conquest and power, providing a reservoir from which to draw in instruction, developing a literature. Our agricultural research has contributed much to both types of benefit, for it deals with matters of common interest. Because it gives popular information, it contributes in no small measure to the development of human intelligence about many of the most essential things of life.

Without research there would have been no science. We should not know the most elementary things about the earth and its relations to the sun and its system. We should have remained in much the same condition as that of the American Indians when Columbus found them. We should have been without the modern conveniences of life, gas and electricity, the telephone, means of transportation, provisions for sanitation, in fact, the basis of civilization. Human ingenuity, accidental discovery, accumulated experience, would have gradually disclosed many essential things, but knowledge would have been purely empirical, the product largely of tradition and custom.

As illustrating the practical importance research has been to agriculture, it has been declared repeatedly that since the coming of experiment stations in this country more progress has been made in the direction of an enlightened and efficient agriculture than in all the years that went before. This in itself ought to be abundant argument for its relation to public welfare, but it might be strengthened by reflecting what would have happened if there had been no organized agencies for investigation in agriculture. If the farmers in the past hundred years, or even the last

half century, had been left to their own experience and devices, how would they have met the problems of diminishing soil fertility, of the conquest of new regions less favorable to agriculture, of the ravages of disease of crops and stock, of new insect enemies—in short, how would they have met the ever-increasing demands of a growing population for food? They could not have gone far without encountering obstacles beyond their ability to surmount. The experience of the war brought more forcibly home to the public the vital interest to the individual of an adequate agriculture, one that could be stimulated and speeded up at a time when other peoples were hungry and starving.

Long continued research has supplied the basis for extension throughout the country of practical, every-day information through the county agent and the home demonstration agent—a vast system of direct aid which has no parallel. The extent to which investigation has enabled the prevention of loss of food products through control of diseases and pests of crops, amounting to millions every year, ought to be a quite direct benefit to the consuming public, since it stabilizes supply and only a small part of the saving goes into the pockets of producers.

Science has made the country more independent of other countries for its food. It has provided a new industry in the production of sugar from beets and developed possibilities which would make the country independent of outside supply if necessity should require. It has introduced new crops for special conditions, greatly extended the area of successful farming, supplied more productive strains.

A rust-resistant or a better adapted strain of wheat means a latent possibility. The fact that not all farmers use it as yet is beside the question. The electric light and the telephone are acceded to be distinct contributions to human welfare, even though their use is still far from universal. If the better wheats and other crops have not raised the average yields perceptibly the country over, they have raised the yield of many producers, and this has gone to swell the sum total and to make more feasible a production to meet the needs. To that extent they have stemmed or retarded the natural tendency toward decline in acre yield, and provided an insurance against shortage.

If these benefits seem remote and indirect to the general public, the provision of a supply of clean milk the year around is a benefit which reaches every family, and it is a notable product of investigation. The same type of activity has shown the dangers of transmission of disease like tuberculosis through food, with such effect that neglect of known precautions has become a crime against society. Science has given more appetizing and attractive food products—the perfect specimen of fruit, superior vegetables throughout the year; and it has taught how these can be preserved and shown their true place in the diet. And finally, it has made more satisfying the answer to the universal prayer to “give us this day our daily bread” by the studies of wheat varieties and their suitability for bread making.

Illustrations of this type could, of course, be multiplied almost indefinitely, but the broad fundamental result is described by greater resourcefulness and efficiency, and increased intelligence about agricultural matters. It is by research that the world has reached the point it now occupies in intelligence and in ability to turn to its account the forces and

the life upon it. "To make of man a reasoning being is to overcome the traditional associations of his mind."

This brings us to the place of research in the agricultural college. The final object of the land-grant college is to diffuse knowledge, to increase intelligence. This, indeed, is the intent of all education and teaching. The argument for research in connection with the agricultural colleges rests upon the broad basis of the value of intellectual progress to mankind.

Research is not only a logical but an essential factor in the development of the idea embodied in the Land-Grant Act. Senator Morrill said that one great purpose of his bill was "to arrest the degenerate and downward system of agriculture by which American soil is rapidly obtaining the rank of the poorest and least productive on the globe," and, furthermore, that not manual but intellectual instruction was the paramount object. The Hatch Act was likewise designed to spread intelligence among the people—not merely among college students; it was a measure for the public.

The practical farmer, the agricultural editor, the teacher, and the student need not merely to know a lot of empirical facts and rules—they need to be intelligent about them, to understand their meaning, limitations, relationships. Research is the only means by which this can be supplied. Hence, research is an underlying function of the teaching institution, in order that a body of sound facts and reasons may be supplied for teaching which will enable the individual to think and act intelligently. The college does not seek merely to develop skill in the individual, but at the same time to instill information which enables intelligent reasoning, for it is not a trade school but an institution for higher education.

Finally, it is through research that the colleges and the universities have been enabled to serve the public rather than the few—to extend their influence to every hamlet in the State and to every individual who will listen. It enables these colleges to realize their dominant quality—to be truly democratic.

The land-grant college represented a breaking away from intellectual aristocracy in education, the opening up of the channels of knowledge to all the people. But without research this democracy could not have been attained. These colleges, even though their doors were thrown open to all who came, must have remained more like the medieval institutions and the old style American colleges—for the favored few and not for the whole public. The experiment stations were the agency which enabled the colleges to realize the high ideal which has made them such a mighty development in education. The position they have attained as one of the most vital forces in human welfare is at once the triumph and the justification of research.

Adjourned.

## SECTION OF AGRICULTURE—EXTENSION WORK

TUESDAY MORNING, NOVEMBER 8, 1921

The chairman of the sub-section, H. J. Baker, Director of Extension of Connecticut presided.

C. B. Smith, Chief of the Office of Extension Work, State Relations Service, United States Department of Agriculture, presented the following paper:

### HOW SHALL WE BRING OUR HOME DEMONSTRATION WORK TO FULLER DEVELOPMENT?

BY C. B. SMITH

All the money contemplated in the original Smith-Lever Act and two million dollars more are available this year for the development of our cooperative extension work. With this money we now have at work about 2,100 county agents, 706 home demonstration agents, 163 county club agents, and 232 colored agents. In addition we have about 700 specialists, besides various supervisory officers. Stated in another way all the money originally contemplated in the Smith-Lever Act, and more, is now tied up, and we have county agents in only about two-thirds of the agricultural counties of the United States, and home demonstration agents in less than one-fourth of them. There remains, therefore, from 500 to 800 counties in the United States which probably should have county agents, and more than 2,000 counties which should have home demonstration agents, with apparently no money in sight to develop this additional work.

The question is: Under these conditions how shall we bring our Home Demonstration Work to fuller development? Presumably this means: How can we increase the number of counties with home demonstration agents?

First of all the matter of funds for the expansion of the work needs consideration, and this is not a very good time to go either to State legislatures or to Congress for it. But in thinking of our resources we recall that this coming year the Smith-Lever Act matures, and will furnish the final \$500,000 available for extension under that act. With this amount it would be possible to put extension work in about 300 additional counties and furnish proper supervision, provided the cooperation of the State college is limited to not to exceed \$1,200 per county. A substantial part of these new counties should of course contain home demonstration agents.

This brings us to another thought which has a bearing on the matter. The experience of the past ten years shows us clearly that if the State college and the Federal Department of Agriculture can contribute as much as \$1,200 per county, almost any county in the United States, if properly approached, will raise the remainder of the funds needed to support a county agent. As a matter of fact a considerable number of States are contributing substantially more than \$1,200 per county from State and Federal sources in support of county agricultural agent work. I am inclined to think that in a good many cases where the college is contributing more than \$1,200 toward the employment of a county agricultural agent they are doing more than they need to and that the excess beyond \$1,200 without any

curtailment of county agent work might well be withdrawn and used in the further development of home demonstration work, using that term in its broad sense to include also club work. Such data as we have available indicate the establishment by this means of a fund around \$736,000 in the 48 States, a sufficient amount to provide around 500 counties with home demonstration agents, and contribute \$1,300 toward the salary of each, besides providing the necessary supervision.

Funds are thus in sight from these two sources, the \$500,000 maturing under the Smith-Lever Act in 1922-23 and the excess above \$1,300 we are now paying in certain counties toward the salaries of county agents amounting to a total of \$1,226,000 with which to further home demonstration and other lines of county work. This total if all used for home demonstration work will enable us to establish such work in 800 new counties, thus more than doubling the number we now have.

The withdrawal of the excess funds from counties in which the college is contributing more than \$1,300 per agent, and using them in establishing additional counties with home demonstration agents need not be done hurriedly. Probably the establishment of not more than 300 to 350 counties with home demonstration agents in all the 48 States should be attempted in any one year, or an average of about five counties per State—the larger States will, of course, put in more than this number.

Up to this point I want simply to establish the fact that, so far as money is concerned, if we hold what we have and get the regular increment of Smith-Lever funds as provided in that act, we have enough for the normal development of home demonstration work for at least the next two or three years, by which time plans should be laid for increasing revenues.

With a certain amount of money in sight for the development of the work, but with financial cooperation of the counties necessary if the work is to be established, we need next, perhaps, to turn our attention to the field; and here it must be said that in a good many sections of the North and West the work needs popularizing. Farmers and their wives are not sufficiently enthusiastic about it. Here we need concentration of effort of our directors and State leaders if the work is going to grow. Wherever a home demonstration agent is established in any State not yet convinced of the value of the work, the home demonstration agent in the county must be given such assistance, and her work must be so directed that the result stands out in the county in a positive way. The farmers need to be not only satisfied with the work done but enthusiastic about it, so that the news will spread into adjoining counties and so that boosters for the work anywhere in the State will have a few successful examples to which to point. Nor can the work grow much until rural women as well as men are convinced of its worth and get behind it and support it both morally and financially. I would like to stress this point a little, with the emphasis on the "rural."

In the northern States I believe the home demonstration agents and home economics specialists are still giving too much attention to urban and semi-urban groups of women. They are easier to reach, have more leisure, and are very responsive to the work. Nevertheless I am firm in the faith that if we want rural women to be interested in the home demonstration agent, the home demonstration agent must make rural women her first



consideration and deal with them directly out where they are. It is true rural women are not well organized, meet together seldom, and may lack in developed leadership but these are the very reasons why we need to take up work with them.

It is my judgment that if we can secure the backing of rural women in home demonstration work it will count infinitely more with county commissioners, Congress and State legislatures in making appropriations in support of home demonstration agents than will the backing of any number of urban women or miscellaneous women's clubs. A larger centering of the home demonstration work with real farm women is to my mind essential to the fullest support of rural women for home demonstration work.

To obtain general and favorable consideration, home demonstration work must also be materially as well as esthetically helpful. This is particularly true wherever the States are not naturally rich or where climatic conditions are fickle. We must not increase the work of farm women as a permanent thing, but we do need to get their support, and if they are in need of funds in order that they may have more home conveniences or better clothes, one of the tasks of the home demonstration agent is to help them earn money to get these things.

I am convinced this element is not given enough attention by home demonstration agents in many communities in the northern and western States, and in my judgment is one of the reasons for the slow development of the work. The ultimate object, of course, of home demonstration work is to relieve the farm woman somewhat of her present long hours of routine work so that she will have more leisure for reading, for companionship with her children and neighbors, for the beautification of her home, for hospitality to her friends, and for a larger part in the life of the community and State. She has home duties that can't be delegated. Nevertheless she is also entitled to the opportunity of taking part along with men in some of the more interesting things of life outside the daily routine of the kitchen. To most farm women this taking part in things outside the kitchen is something lying mostly in the future. They have not yet gotten much beyond the kitchen, and in home demonstration work we must begin where they now are, with material and very directly helpful things.

To some extent directors of extension have failed to give a full measure of assistance in home demonstration work. They have secured State leaders and then left the development of the work almost wholly to such leaders. This is not enough. The work with women is a new work, and a difficult work. Extension experience in it is much less than in agriculture. The work isn't very clearly outlined yet. Many of the home demonstration agents have not had the advantage of training at an agricultural college. A large number are town girls and have had training only in women's colleges. They need, therefore, even more of the director's time than do men agents, and have, perhaps, generally received less. Now that the agricultural work with its county agents and specialists is on a reasonably certain basis, may we not look forward to the directors giving more of their time and constructive genius to the development of the home demonstration work?

Another matter which has a bearing on the somewhat slow development of extension work in home economics in the North is the apparently

large amount of class work, lectures, and reading assignments in books. These terms are in the projects of nearly every northern State sent into the States Relations Service for approval.

We have not developed our agricultural extension work on the basis of forming small groups of farmers to whom we give six to 12 lectures and lessons and text-book assignments. We have gotten away from that idea almost entirely in agriculture. Do we not need to develop to a large extent the doing of actual pieces of demonstration work with women as our primary task, leaving to the Smith-Hughes forces and the schools the orderly teaching through lessons and text-book assignments? This school type of work rather than meeting the immediate needs of farm women, I believe, is a factor in the slow development of our work with women. May we not look forward to more actual demonstrations by the farm women themselves as their actual needs determine rather than so large an amount of book instruction? This, I think, will be a popularizing factor in the future development of home demonstration work.

Another thing which will, in my mind, help to bring the demonstration work to fuller development is for the director and his assistants at the beginning of the year to sit down and consider their State, county by county, and select for special consideration those counties that are most promising for the establishment of home demonstration agents, and then go systematically about selling the idea to such selected counties. Some colleges hesitate to urge their wares on the people but prefer to have the people come to the college and ask for the agent. This idea is all right provided the college takes particular pains to see that the people are made fully aware of what the college has available for them. My point is the college may well give its encouragement each year to those particular counties which seem to be most sympathetic toward the work. Fully explain the work to these counties, start some one piece of work through specialists that has particular significance to rural women, and thus give the people opportunity to see and taste, and want more.

The county agent already in a county also may well be the forerunner of the home demonstration agent, and in most cases will be glad to be that forerunner, provided he is encouraged in it by the home demonstration leader or director. The major work of a home demonstration agent is to extend home economics instruction. There are phases of home economics that county agricultural agents can give instruction in, particularly rural engineering and sanitation, and they should do this. In addition the director might well arrange for the county agricultural agent to let the farm women know of the assistance the college is prepared to render them on their clothing, food, and home management problems, and make arrangements with one or more groups of women to get some of this help. The home economics specialists from the college then should make the work of this women's group in the county so worthwhile that the farm women will see the value of a trained agent in their midst to help them continuously in their work, and thus the basis will be laid for the putting on of a permanent home demonstration agent. A number of States, through the agency of good home economics specialists working in close cooperation with groups of women organized by county agricultural agents are rapidly preparing the way for home demonstration agents. The work that the home economics specialists do in such counties must supplement and add

to the work of the agricultural agent there. If it does that the county agricultural agent will become a booster for home demonstration work 365 days in the year, whereas starting work in the county without taking him into consideration often leaves him neutral in his attitude, or actually opposed to it. Too frequently the value of the county agent in creating a demand for the home demonstration agent is overlooked by the State home demonstration leader.

Summarizing, then, I would leave in your minds these things:

(1) Money for the fuller development of home demonstration work is in sight, or can be made available by adjustment, in sufficient amount for nearly 800 new counties, with a contribution from the college of \$1,200 per county.

(2) The fuller development of home demonstration work depends upon making the work we now have so successful that rural women and men will talk about it and point to it as something to be desired.

(3) The director's personal help is needed in larger measure in organizing, correlating, and furthering this work at this particular time.

(4) The county agricultural agents can be a powerful help in the development of home demonstration work if they are properly approached and given sympathetic help on a thing which they know little about but the extension of which will help to show his usefulness in the county. Home demonstration leaders should take them more largely into account.

(5) The program of the home demonstration agent in the majority of communities must be financially and materially as well as esthetically helpful if the work is to receive the fullest support of farmers and farm women.

(6) A goal set by the director and his staff at the beginning of the year as to the number of new counties to be organized during the year and the particular counties on which efforts will be centered will assure greater certainty of accomplishment than as though such plans were not made.

Finally, may I add, that in my judgment, in most States home demonstration work is getting its stride. It is accomplishing worthwhile results. It is clearly on the up-grade. As the work progresses new visions and possibilities of the work are opening up and there is little doubt, from what I know of it now, but that it is destined to have as far-reaching fundamental effect in influencing and raising the standards of achievement and living in rural districts and in making country life a satisfactory life, as does our agricultural work.

B. H. САСНЕХОН, University of California. California has not participated in the downward curves for home demonstration agents. The number of agents in California has steadily grown and seemingly this has been accompanied by an increasing demand and appreciation by the people of the State.

I wish it were possible for me to know exactly what factors are responsible for the success of the work in California but it is impossible for us to know exactly what are the determinant questions that make for success or failure. I can only recount some of the seemingly important policies which we believe have made for the success of the work and among these are:

(1) No extension agent is put in a county until there is a well or-

ganized demand from the people for his or her services. We require that the people shall form a special organization through which the agent is to work. In the case of the home demonstration agent, this organization is a farm home department of the county farm bureau. Furthermore, we require that the people shall, themselves, secure an appropriation from their county board of supervisors to pay the local expenses of such an agent.

(2) The entire salary of all extension agents in California is paid from State and Federal funds. The extension division appoints the man or woman, pays the entire salary, and supervises the work. The agents in California are agents of the State college and the Department of Agriculture.

(3) The program of work within the county and the State is a unified program of work. To us there seems to be only one problem, namely, to improve the rural conditions of the district covered. In such improvement our agents participate but whether this work is to be done through the county agent, the home demonstration agent or the club agent is a matter for local analysis and decision.

(4) In order that the above unity may be preserved, we look to one of our agents in the county as county extension director to have charge of all branches of the work in exactly the same way as the State extension director has charge of the work in the State. He will, of course, consult with and defer to our other agents in the county but we feel we must have one person to whom we may look for the general coordination and promotion of the work in the county.

(5) The projects undertaken in the county are determined largely by the people with such advice and direction as we may have to offer. Many of these projects call for the participation of men and women alike, both working upon the same project. Others are of such a nature that men alone can further them, while others necessarily fall within the sphere of the women. The point I desire to make is, there is no marked division between men and women but rather do we encourage projects in which both may help. As a typical and very simple project, I may cite the example of our little home evaporator for which we have had an extensive campaign during this last year. The college division of food preservation invented a commercial fruit evaporator. We asked them to modify the invention for use in the home and the result was that they brought out for us a home evaporator which costs only a few dollars and with which fruits and vegetables may be successfully dehydrated. Counties or communities which adopt that project meet together in a joint gathering of men and women to which the specialist brings a knock-down working model of the evaporator. At this meeting the men with saw and hammer build one of these home evaporators, while the women prepare fruits and vegetables which are there and then dehydrated in the knock-down model. Thus at this one meeting the processes of building the evaporator and dehydrating the fruit are shown and the interest of the entire community is aroused in this simple machine. Time will not permit me to described the similar working out of larger and more complex projects but the above example indicates the general theory of the united program of work for both men and women.

(6) We have tried to pay a scale of salary which would procure for us well trained people. I noted in the report of home demonstration

work for 1919<sup>1</sup> that the average salary for home demonstration agents in the northern and western States was stated to be \$1,550. It hardly seems possible that this figure can be correct, but, if so, it might furnish us a clue as to the cause of the depressing curve of the decrease of home demonstration agents. It is obviously necessary that the women employed be well trained. So long as high schools pay a larger salary for the services of a domestic science teacher, a position which is obviously easier, than is paid for home demonstration work, it is hard to conceive how competent people can be held in home demonstration work.

In California the men believe quite as firmly as the women in the success and future of home demonstrations. Each year we conduct a tour which lasts a week and which travels by automobile through half a dozen counties. On these tours the farm bureau representatives from all the counties of the State have seen successful home demonstration work and have returned home to promote it in their counties. We have recently installed five additional home demonstration agents. This number could be greatly increased if additional funds were available.

L. A. CLINTON, New Jersey State College of Agriculture. We are rather proud of the development of the home demonstration work in New Jersey. Started as a war emergency proposition, supported by war emergency funds, it was organized on such a sound basis that after the war was over, and the emergency funds were withdrawn, the people of the counties said they wanted the work continued, and funds were made available through county, State, and Federal appropriations. In every county of New Jersey where home demonstration work was started as a war measure, it has been continued and ample funds from public sources have been made available to support the work. The work has grown slowly but surely, one or two new counties a year having provided funds and organized for the support of home demonstration agents.

Before any county can be expected to develop a desire for a home demonstration agent, it is necessary in some way to bring to it in a convincing manner the benefits which come from having a home demonstration agent. We have, therefore, thought it wise not to concern ourselves particularly about spreading the work to new counties but to be exceedingly anxious that the work shall make good in those counties where home demonstration agents have been employed. To accomplish this purpose, the women of the county have organized into committees and groups for the purpose of backing up the home demonstration agent in her work.

It has been found true in home demonstration agent work, as well as in county agent work, that one agent is entirely inadequate to perform all that is demanded by a county. This has made it necessary that the women of the county should themselves become cooperators and demonstrators, that forward-looking women should develop in their communities groups for work, and should become leaders of these groups. The few specialists in home economics who have been employed by the extension service have devoted a large part of their time to work in these counties. Wherever this work has been undertaken and an agent employed the work has been made to count for so much that the people of the county talk about it and its influence spreads to other counties. It is not enough that good work shall be done by a home demonstration agent, but it is just as

<sup>1</sup> U. S. Dept. Agr. Circ. 141.

important that a publicity system shall be organized so that the people within the county and the people of other counties shall all learn what home demonstration agent work is.

I would class as one of the most important agencies making for the development of home demonstration agent work a well organized publicity department in the extension service. Have a publicity agent go out in the county where the work is being done, get in contact with particular phases of the work, take photographs, and then write this work up in such a way that people will read it. We have maintained a paper published jointly by the extension service and the college, in which we have written up stories of extension work. This paper is sent to people in every county of the State and to anyone in the State who may request a copy. Through this means, we have been able to carry the message of home demonstration agent work to new counties.

Another means which has been found worth while is through the employment of an assistant in home economics extension work with headquarters at the college, but who can be used for service in any county where interest seems to be developing in the home demonstration agent work. Requests will come in from a county for a speaker at a grange meeting or at a community meeting. In accepting this invitation, arrangements are made so that the speaker can spend a few days in the county prior to the meeting, and a few days in following up the work after the meeting. The people are informed that this agent is loaned to them for a time, but that during her time of service in the county, her work will be similar to work done by a home demonstration agent in counties where such agents are located. After leaving this assistant in the county for a few days, she is sent to some other county, but the people have had an opportunity to learn of the real service which can be performed by a home demonstration agent, and soon another call will come for service. Sometimes this call is accepted, and sometimes not, depending upon the circumstances. Care needs to be exercised in answering the calls from a county that the people will not come to think they are able to get all the service they desire without putting up any money of their own. Soon the women of the county will begin to inquire why they are not as much entitled to a home demonstration agent as the men are entitled to a county agent, and when they begin to ask that question they are well on the way towards the employment of a home demonstration agent.

We believe that the employment of specialists in home economics subjects is just as important as in agricultural subjects, and if home demonstration agent work is to succeed, there must be the help of the subject-matter specialist. We have but two of these in New Jersey, one in clothing work and one in nutrition. When funds are available, we hope to employ a specialist in home management.

In summing up then, I would say that if no home demonstration agents are employed in the State, and it is desired to promote that line of work, I would employ one or two well-trained women, and give them the title of assistants in home economics. I would locate them temporarily in a county where the women were desirous of doing some work, and let them explain to the people that their services for the time they are there is similar to that which would be performed by a home demonstration agent. If these assistants are of the right kind, it will not be very long before the

women of the county will begin to say that the work is so valuable that they wish an agent who can devote her entire time to the work in the county. After the work is started in the country the entire force of the extension service, so far as needed, should be put back of it in order that it shall not fail. Not only must good work be done, but the publicity must be adequately organized and at work. Extension people are not usually noted for over-modesty in proclaiming their wares, but oftentimes a good story of extension work remains untold, which if it were told, would be of great value in making this service known to the people.

One-half of the New Jersey counties are now organized and employing full time home demonstration agents. One or two additional counties are making request for cooperation each year. It is important that the work does not grow too fast, but that it shall develop only so fast as it can do so on a sound basis. In our own case, the home demonstration work is on just as sound a footing as the county agent work and has made a place for itself in the counties which is not second to that of any other line of extension work.

Henry C. Taylor, Chief Bureau of Markets and Crops Estimates, United States Department of Agriculture, presented the following paper:

#### AGRICULTURAL EXTENSION SERVICE IN ECONOMICS

BY HENRY C. TAYLOR

Extension work in agricultural economics has for its objective the teaching of farmers to think in terms of economic facts and forces. An important function included under this general heading is the supplying of the facts in terms of which the farmer should think. Thinking may be defined as "seeing the relations of facts to problems." Farmers usually lack sufficient facts in terms of which to think effectively on economic problems. This leads to thinking in terms of assumptions or scanty information. This explains many conclusions, which when acted upon, lead to misfortune. While providing facts is of first importance, extension work should not stop with the dissemination of information. The larger task is to teach the farmers to see the relation of facts to the questions of what to produce, how to organize production and how to market the product. Here is a large task which can be accomplished through the persistent effort of men who understand economic forces in action and who have the backing of competent research workers.

This backing of the research workers is important. The materials for extension work on economic problems should be the results of researches which have been matured to the point where they may be extended, or carried, to those who may benefit by them in their every day work. Likewise, the farmer's problem as seen by the extension worker is the starting point in research. Hence, the importance of the closest possible relation between research and extension workers. This is necessary if research is not to become sterile and if extension work is not to be superficial.

In order that we may more clearly understand the importance of this close cooperation between the two groups of workers, let us outline some of the classes of economic problems which challenge the attention of the farmer. The question of what to produce is an ever recurring one. The

history of American agriculture shows that readjustments have been forced upon the farmers from time to time, due to the growth of great cities, to changes in the cost of transportation, to variations in demand, and to the introduction of new crops. At times these questions seem to be settled and then again they come into the foreground.

For example, the growth of manufacturing cities in New England transformed the agriculture of New England from a self-sufficing economy to a commercial economy, during the early part of the last century. Following this the development of the railways made it necessary for the New England farmer to reorganize his farming by largely omitting wool and beef and other articles which, because of their durability and specific value, could be shipped from the West, and to devote himself to the bulky or perishable articles such as hay, vegetables, and milk. Today a change in the freight rates again suggests the necessity of new shifts. Furthermore, the question of choice of crops arises every time the crop specialists from the college, or the advertisements of seedmen, propose the introduction of a new hay crop or a new variety of corn, wheat or oats.

For example, the efforts to introduce alfalfa in the Corn Belt were carried forward without sufficient attention to the influence the crop would have on the farmer's labor program or his crop rotation. The big story was "large yield" and "fine feed," without ascertaining whether it meant larger total income and greater profits. This leads to the suggestion that not only must there be cooperation between the research workers and the extension workers, but also that there should be the closest cooperation between the crop or livestock specialists and the economic specialists.

Indeed, it is a question whether the man who is to give specific advice to the farmer on crop production should not combine the results of all the research specialists who deal with the physical, the biological, or the economic phases of the problem, in order that he may carry to the farmer a well rounded result. This would reduce the danger of misleading the farmer, but it puts a heavy load upon the extension worker. The alternative is to press forward with the teaching of the principles of farm organization to the farmers, and then depend upon them to make such use of crop and livestock specialists as may fit into the plan of farm organization decided upon. This plan is perhaps the more feasible for a number of reasons: (1) The extension agent can not always be present to advise the farmer; (2) true teaching methods lead to independent thought, which makes continuous help unnecessary; (3) economic conditions are ever changing so that what is good advice at one time may be bad at another. For these reasons it would seem that economic extension work on the choice of crops should consist of enunciating the principles to be followed and in continually presenting through the press the facts regarding production, demand, and prices which give basis for decisions as to what to produce at a given time in a given place. More specifically, this means the carrying forward of the work now in progress in farm bookkeeping and the analysis of the farm business, which, being interpreted, is the application of arithmetic to the problem of farm profits in a manner which will show which of several competitive crops will add most to the total farm profit and how the non-competing crops can be combined into a most satisfactory system of farming in the light of given marketing conditions and price trends.



But the arithmetic of crop selection is only the beginning of farm economics. Close upon the heels of this problem follow the questions of farm lay-out, size of fields, and the size of farms to fit the combination of enterprises which has been decided upon. This is another problem in arithmetic in which the amount of work a man, or a man and team, can accomplish in the different lines of production becomes a basic factor in the calculation. Before these factors can be used, however, in computing the size of fields or the size of the dairy herd, the old question of intensity of culture comes up for an answer. Put in concrete form, this question is: Should one man and team undertake to produce 20, 30, or 40 acres of corn, recognizing that on the smaller area a larger yield per acre can be produced but that on the larger area it may be possible to produce a much greater total product per man? This is, of course, not a question which can be answered for farmers in general. Differences in soil and climate, as well as differences in the skill and energy of the men and the equipment used, make this impossible.

The thing we should hope to do is to make our extension work in farm arithmetic include a few new items from time to time. From what to produce, we can move on to the methods of figuring proper degree of intensity. These, together, give basis for figuring size of fields and the proper size of farm for the given farmer who knows his labor force and has measured the task with his own arm and knows what he can accomplish.

Closely connected with the problem of farm organization are the questions of farm labor, farm tenancy and ownership, credit and insurance, in which the leading farmers are taking an intelligent interest. But important as all these questions relating to production are recognized to be, the farmers are more interested in marketing than in anything else today. It follows, therefore, that economic extension workers should give much attention to marketing problems. The question is: What shall we teach and what methods shall we use?

Shall we teach that the present price situation is due to unfair and inefficient practices on the part of middlemen and that the remedy lies in displacing the present marketing system with one owned and controlled by farmers, or shall we encourage more farmers to look behind the price quotation to the conditions which account for the supply of farm products and the conditions which limit the purchasing power and, hence, the demand of those who desire our products? The latter line of procedure may be less popular but it is the basis of adjusting production to the market conditions and is necessary if agriculture is to be profitable, whether the marketing is done cooperatively or as a private undertaking.

Furthermore, the study of market demands leads not only to the adjustment of production in quantity and quality to suit the market, but it leads to proper grading and packing, both of which are important steps in the proper marketing of many classes of products.

The teaching of the marketing processes by illustrated lectures would result in more intelligent views of what can be done and what needs to be done to improve present marketing methods. Thoughtful study of the matter will lead to sane views of where cooperation will improve the system of marketing and prepare farmers for cooperation, when desirable, by making clear to them the part they must, themselves, play if

cooperative marketing is to succeed. This same educational work will point out where State and Federal regulation may prove the better means of improving market conditions. The general rule in dealing with the marketing question should be to educate but not to agitate, to show the conditions of success and the causes for failure in cooperative marketing, but neither to urge people to cooperate nor to take the lead in the organization or operation of cooperative companies. The same aid should be available for cooperative and private undertaking. The objectives are efficient marketing and fair prices.

Having given this much attention to the subject matter of economic extension work, the next question is: How shall we as State and Federal forces organize for extension work in economics?

In the farm management demonstrators working with the county agents we have a nucleus which will make a good foundation for future growth. While these men have been supposed to limit their work to farm management, they have found by experience that they can not segregate the problems of farm organization from the problems of marketing because of their intimate relation and because the farmer is at present more interested in marketing than in farm management. Naturally, the farmer would prefer to have the market adjusted to his system of farming, rather than to adjust his farming to the conditions of the market.

So far as I know, the extension work in marketing and in farm management is generally in the same department of the college. It is expected that in the future the two lines of work will be combined in one bureau in the Federal Department of Agriculture. It would seem, therefore, that the time is ripe to call the men doing extension work in these fields "Economic Specialists." In some States there may be but one, in others there may be several, and the division of labor may be worked out on commodity lines or certain men may work on special production problems and others on marketing problems, as the case may seem to warrant.

In any case the present plan of one or more jointly paid extension specialists, lodged in close connection with the college department of agricultural economics, functioning as a part of the State extension system, drawing upon the results of research both State and Federal, should, I believe, be the central feature of the extension work in agricultural economics.

This extension service centering at the agricultural colleges should be supplemented by an adequate crop and market news service. Cooperation in the news service is developing between the Federal department and the State departments of agriculture or bureaus of markets. The Federal department is collecting crop and market news in the competing countries and on the important markets. This information is furnished to the State department of agriculture from which it is distributed by radio and by circulars throughout the States. In addition to this, market statements are prepared by the Federal department for the press from day to day. The interpretation of this news in terms of what the farmer should plan to produce in the coming year and when he should sell the crops he has on hand is and should be left to the farmer. The more completely the economic extension work of the colleges has been done the more satisfactorily will the economic facts presented in the news service

be understood and the more successful will be the farmers in adjusting their production to demands of the market. The extension service of the college, combined with the market news service, should in a few years clear up some of the misunderstanding which is so common today on economic questions and give a more intelligent basis for the efforts which have for their goal "better farming, better business and better living."

The following paper was presented by E. Dwight Sanderson, New York State College of Agriculture:

#### AN EXTENSION PROGRAM IN RURAL SOCIAL ORGANIZATION

BY E. DWIGHT SANDERSON

Dean Bailey is responsible for the assertion that agriculture is not merely a vocation but is a mode of life. It involves not only the farm, but the farm home. Though the work of the farm takes the larger part of a farmer's energy and satisfies many of his natural interests, it is by no means the most intimate part of his life; and though housekeeping and the care of the family occupies most of the time of the farm woman, she is also concerned with the life of her community. The Smith-Lever Act recognized this cultural aspect of farm life when it specified that extension work should be carried on not only in agriculture, but in home economics. It recognized the home and the farm as essential to each other.

As farmers have been unsatisfied with extension work which dealt with only the technique of production and demanded assistance in their marketing and economic problems, so farm women are demanding that home economics be construed as something broader than nutrition, clothing, and household management; and that extension work in home-making must promote all that is essential for the best life of the rural home. Extension work must deal with the social or human side of farm life as well as with its material basis.

Several States have already started definite extension projects in rural social organization, and a survey of their object, methods, and achievements would be most instructive at the present time. I hope someone may be able to undertake such a study and present us with the findings. In view of the general interest in this field, your chairman has asked me to discuss the scope of extension work in rural social organization.<sup>1</sup>

The objective of rural social organization is to foster such a social environment as will make possible the best type of rural life. Leaving aside the physical or material environment and its effect, as soon as we consider man's social environment we become aware that it is chiefly determined by the life of the groups in which men associate, and concerned with human institutions and associations. Our main problem is how to adjust the behavior of these different groups so that they will be most conducive to the general welfare of each individual and of each community. Men associate to satisfy certain fundamental desires or interests which have

<sup>1</sup> I use the term "rural social organization" rather than the more usual term "rural sociology," for if there be a rural sociology it deals with the laws and principles of human association in rural territory. Few such generalizations have been established, and in any event they would serve chiefly to determine policies and objectives for extension work in this field. The practical problems of human welfare on the farm are chiefly problems of social organization conceived in its broadest sense; they are problems of adjustment between different groups of persons formed for satisfying various fundamental human interests.

been conveniently classified as those of health, wealth, knowledge, sociability, beauty, and rightness. Each of these interests has given rise to certain institutions, organizations, and informal groups. The most fundamental sociological concept is that these are but different phases of human life and that as the life of the most normal individual is unified by certain purposes which give the individual his character, so humanity associating in groups must recognize their interdependence, that each of them serves a certain class of human interests, but that the satisfaction of all human interests is essential for the highest type of life, which can be provided by no one institution or organization. The sociological problem is that of best adjusting the activities of these different groups so that they may function most effectively for the highest human welfare. Social organization must, therefore, deal with all phases of the social environment.

Social organization thus includes the social aspects of man's economic interests and problems, but in this discussion we shall omit economic factors as being within the field of the rural economist. We must further recognize the division of labor which becomes necessary in so large a field, and the development of special techniques for dealing with different phases of life. Thus rural education has now become a well recognized department. Rural health is supervised by State and local health departments and we are developing a new profession of rural public health nursing. The interests of the rural church are being considered in separate courses in our theological seminaries and are encouraged by special secretaries and organizations of our religious denominations. Rural recreation is being developed by play supervisors and instructors in physical education. In the field of art, rural planning is the work of landscape architects, and the dissemination of literature is the work of the professional rural librarian. Family case work has been peculiarly the field of applied sociology, but in the future it may be considered a phase of domestic science. Community organization and development seems to be peculiarly the province of the sociologist and in it he is compelled to make use of specialists in the above fields so far as their help is available. Rural organization will consist very largely, therefore, in promoting the work of various agencies and organizations in these several fields and in endeavoring to develop a social consciousness among various groups so that they will voluntarily coordinate their efforts for the greatest common good.

These generalities may seem academic, but they are essential to the wise development of a permanent extension policy in this field. Just what extension work in rural social organization may cover will depend upon the size of the staff and the division of labor. The time may come when extension work in rural recreation and rural health will be as distinct as that in dairying and soils now is. Furthermore, in many of our State universities the general extension division is carrying on many lines of social work which will limit, though supplementing and assisting, the program of the specialist in rural social organization. His program may include projects in any or all of the above fields, or it may be limited to the more general phases of rural organization.

The extension specialist in this field may be an expert in recreation, or in education, or what not, but it is not necessary that he should have a highly technical training in any of these fields. He should, however, be in touch with the best forms of organization and methods of procedure

in all phases of rural life. His office should be a clearing house for the best sources of information on rural social problems. The extension worker in this department should be an authority on methods of organization and of discovering and training leadership as the animal husbandry specialist is an authority in judging cattle. If the extension worker has not the qualifications which enable him to speak with authority on these topics, then he is too small for the job, for the native common sense of one man may be as good as that of another and unless the specialist has some scientific basis for the procedure he advocates he may be a good "uplifter," but his authority will always be limited and he will hardly be a safe guide in this the most complex field of agricultural science.

Any extension program in rural social organization must necessarily be largely determined by local conditions. Thus Kansas has done some excellent work in its "Harvest Service," which would be entirely unnecessary in New England. In New York there is a keen interest in community houses, but they may be quite impossible in some sections of the country.

In general, I believe that extension work in this field may well commence with those activities of rural life for the improvement of which the need is most keenly felt, which will develop the least friction or antagonism in their achievement, and which will involve the greatest satisfaction and generate the most community spirit in their accomplishment. Projects in rural recreation and rural art, as suggested below, will most frequently meet these considerations. On this point Dr. Newell L. Sims<sup>1</sup> has propounded a most suggestive "law of rural socialization" as follows: "Cooperation in rural neighborhoods has its genesis in and development through those forms of association which, beginning on the basis of least cost, gradually rise through planes of increasing cost to the stage of greatest cost in effort demanded, and which give at the same time ever increasing and more enduring benefits and satisfactions to the groups." "Normally," he says, "it is only where the cost is at the minimum that the unsocialized rural people will get together and function groupwise; and normally, it is only by virtue of the cumulative effects of such functioning that the gradual integration of a real community mind takes place and makes possible cooperation on the basis of ever-increasing cost."

Let us attempt, then, to merely catalog some of the extension projects which may be undertaken in rural social organization:

(1) *Rural recreation.* In no phase of life is the country feeling the competition of the city more than in that of play and recreation. Rural people must be converted to the educational value of play for their children and of the economic value of wholesome recreation for themselves. Play for children may best be fostered in cooperation with the school authorities through the organization of local play festivals and athletic meets.<sup>2</sup> In "selling" the play idea to rural people one of the most effective methods is to introduce some simple stunts or games at farm bureau meetings. If adapted to the occasion and surroundings, they will arouse not only a desire for more of this sort of amusement, but will put the audience in a much more receptive mood for the message of the meeting. The county farm bureau picnic has been one of the greatest assets in building

<sup>1</sup> N. L. Sims, *The Rural Community*, p. 640. Scribner's, 1920.

<sup>2</sup> C. J. Galpin and Eleanore Welsman, *Play Days in Rural Schools*, Circular 118, Extension Service, College of Agriculture, University of Wisconsin, Madison, Wis.

*esprit de corps* in the organization and in many places is being made the occasion of enjoyable demonstrations of various play and recreational activities for groups of different ages. No better occasion can be secured for making a practical demonstration and every assistance should be given in outlining programs and developing leadership for the successful conduct of county and community picnics. The "Little Country Theatre" idea so ably started by Professor A. G. Arvold in North Dakota, has spread over the country, and rural dramatics promise to be a permanent asset of rural life. Loaning packages of sample plays from which local groups may make a selection and order from the publishers has proven a popular feature of our own work and may do much to improve the quality of the plays given. The Little Country Theatre, conducted by the Cornell Dramatic Club for the last three years at the State fair, has incited several county fairs to introduce the same feature under the auspices of the farm and home bureaus. This year three county fairs in New York State produced pageants which were among their most attractive features, and which secured the cooperation and interest of people from all parts of the county and from all conditions of life as never before, thus doing much to create a community feeling in the county. Effective extension work in pageantry has been done in Kansas, North Dakota, and West Virginia (in boys' and girls' club work).<sup>1</sup>

One of the greatest needs of most rural communities is more adequate facilities for play and recreation. Community houses, playgrounds, picnic grounds and park reserves along waterways and in scenic situations, should be definitely encouraged by the extension service. At present there is a lively interest in community houses. Probably no other community enterprise will involve more problems for the extension worker in rural social organization or will better test his ability to be of real constructive service.

(2) *Rural art.* Construing this field broadly, such enterprises as magazine and book clubs, and library promotion, for securing better literature on the farm; community singing, community choruses, orchestras and bands; and itinerant moving picture shows, as so successfully carried on in North Carolina by the State department of education, should be encouraged. Information as to how a community band or orchestra may be organized and where professional musical leaders or dramatic coaches can be secured, may be an important service. One community in eastern New York has developed a very real though entirely informal community organization through fortnightly community sings, at which all sorts of community activities are discussed and a general good time is had. In another instance a community council grew out of a series of community sings and was the direct result of a desire to bring together and get general support for a band and orchestra. Although farm planning is within the field of farm management and landscape art, there are certain general phases of the arrangement of the homestead which have a distinctly social aspect and may well be emphasized in discussions of community improvement. Thus Dr. Galpin has recently pointed out the desirability of separating the farm business from the farm home by taking the barn away from the house—in New York it is very often directly across the road in

<sup>1</sup> The New York State College of Agriculture will soon publish a bulletin giving suggestions for the production of rural pageants.

front of the house—so that there may a real home-yard whose outlook is not confined to the barn-yard.

(3) *Rural health.* Several States are now employing extension specialists in rural health, but in most cases the worker in rural social organization may do much to arouse interest in better health, particularly in cooperation with the home economics workers. Lectures on the social and economic values of good health, and the social obligation of preventing the spread of disease, may be given on all suitable occasions. The employment of a public health nurse is a community enterprise which may be the first step in community organization. In this whole field the extension worker in rural social organization should endeavor to utilize the farm bureaus to acquaint country people with the agencies which they may develop for maintaining better health conditions. Such work will, of course, be carried on in cooperation with State and local departments of health and with such organizations as the Red Cross and local health associations. The extension service should not attempt to give any technical health service, but it should use its facilities for health education. Consideration should also be given to the problems of mental health. There is no greater menace to the countryside than the neglected feeble-minded, who are allowed to perpetuate their kind at the expense of the community. Only through a better understanding of the nature and amount of feeble-mindedness and its possible effect on their own families can people be educated to the point where they will deal with it in a common sense manner. Of all classes of people, farmers are the best informed on the principles of breeding and eugenics, and if the matter be presented to them in terms of their common experience with livestock, it should not be long before it would be possible to build up a public opinion which would demand adequate control of the mentally deficient.

(4) *Rural education.* The departments of rural education are now well organized to care for extension work, but the specialist in rural social organization may be of service to the schools as well as other institutions. Thus the general policies and plans of organization and procedure governing the use of the schoolhouse as a social center are problems of rural social organization rather than rural education and the school people should look to the extension specialist for help with them. No rural institution has such possibilities for public service as the school, but it must have an understanding of its sphere of usefulness and of its own limitations if it would function most effectively. A wise extension worker will not encourage the school to take on functions for which it is not adapted, as is now being done by certain enthusiasts who fail to appreciate some of the fundamental principles of social organization.

At the present introductory stage of the study of social problems in rural high schools, the extension worker may be of assistance to teachers as a subject-matter specialist, and in the same way may encourage the teaching of community civics in the country schools. Well prepared publications will be of the same sort of service in these branches as they have been in nature study, agriculture, and home economics. A good example is Professor C. J. Galpin's circular<sup>1</sup> on how to make a social survey of a rural school district.

<sup>1</sup> C. J. Galpin, G. W. Davies, Grace Wyman-Stone, *Social Surveys of Rural School Districts, How Made and How Utilized*, Circular 122, Extension Service, College of Agriculture, University of Wisconsin, Madison, Wis.

(5) *Rural religion.* We must recognize that in many respects the church is the most powerful rural institution, and although the extension worker employed by the State can not promote religion as such, he should be willing to give every assistance possible to rural churches of all sorts as important institutions of rural life and potential agencies for attacking many rural social problems. Many of the agricultural colleges have given short courses for country ministers, which seem to have met a real need. Might not extension schools be arranged for the ministers of one or several adjoining counties, through the cooperation of denominational leaders? There is a demand for correspondence courses on rural life problems for country ministers and for outlines to be used by study classes. The extension worker will, of course, give lectures on rural social problems before local churches as far as time may permit, but will give special attention to discussing the opportunities of the rural church before conferences and conventions of churches, bringing them a vision of the place of religion in rural life and of the church as a rural institution.

(6) *Community organization.* I have before addressed this section upon the part which the extension service may play in community organization<sup>1</sup> and little need be added to what was then said.

The farm bureau has committed itself to the community unit for local organization and the determination of community areas by the county farm bureaus is having a powerful influence on community organization. The importance of establishing community areas upon the basis of the best sociological principles is obvious, and the extension specialist in rural social organization may give invaluable service to the county agents by assisting them in mapping the natural social units of their counties.<sup>2</sup>

As extension workers we must recognize that the farm bureau is only one of several institutions in the rural community, and that though it may have a broad program and touch many phases of life, it can not permanently assume community leadership in all lines. We need to bring together all the organizations, institutions, agencies, and interests in rural communities into local community councils, community improvement leagues community clubs, or whatever type of organization may be best adapted to meet the local need, as fast as communities are ready. Such formal organization of community work must be a matter of rather slow growth and can not be forced. The establishment of good community spirit must always precede any formal mechanism for unifying community activities. One of the best means yet devised for developing community consciousness through a process of self-analysis is the "Community Score Card," so successfully used by the West Virginia extension service.<sup>3</sup> Several States have recently issued helpful publications on community organization and a number of excellent books have recently been published.<sup>4</sup>

<sup>1</sup> Community Organization for Extension Service. Proc. 33rd An. Conv. Assoc. Amer. Agr. Colleges and Exp. Stas., p. 250; also printed in Proceedings of the First National Country Life Conference. Also see a paper by the writer on Rural Community Organization in Proc. 3rd Nat. Country Life Conf. University of Chicago Press, 1921.

<sup>2</sup> See Locating the Rural Community, Lesson 158, Cornell Reading Course for the Farm.

<sup>3</sup> Country Community Score Card, Bulletin 240, Extension Division, College of Agriculture, West Virginia University; A. J. Dadisman, French Creek as a Rural Community, Bulletin 176, West Virginia Agricultural Experiment Station.

<sup>4</sup> See Walter Burr, Rural Organization, Macmillan Co., 1921; Newell L. Sims, The Rural Community, Scribner's, 1920; Hayes, Rural Organization, University of Chicago Press, 1921; Rural Organization, Proc. 3rd Nat. Country Life Conference, University of Chicago Press, 1921; E. C. Lindeman, The Community, Association Press, 1921.



Another large field of service in rural organization will be in assisting the formation of county and State conferences or councils of organizations engaged in rural social work. The American Country Life Association has formed a council of national agencies engaged in rural social work and the representatives of national agencies composing it are agreed upon the desirability of the formation of such county and State councils or conferences as a means of securing a better understanding between local agencies and a better coordination of their efforts. As the work of the farm bureau takes up the larger problems of home and community life it must become better acquainted with the various agencies which can furnish technical assistance and which should be encouraged wherever their services are needed.

Such is the general field for extension work in rural social organization. As with all extension work the methods to be employed may be classed in a general way as those of education and those of organization.

Educational methods will include lectures, publications, correspondence courses, articles for the press, and extension schools. Why may we not hold extension schools for training rural leaders upon the social problems of rural life, with a corps of specialists as instructors, in the same manner as we do in agriculture and home making. Various organizations will gladly furnish instructors in their special fields. Country life institutes have been successful under various auspices in many parts of the country. Are we not ready for a more serious sort of systematic instruction which will give knowledge as well as enthusiasm?

Organization work will include assistance in the formation of local community organizations, the management of community houses, county and State conferences as suggested above, assistance in social surveys, promoting play festivals, and in organizing community activities of all sorts. Obviously the one or two specialists on the extension staff will be unable to do much personal work in a large number of local communities. They will rather seek to work through the other members of the extension staff and the county agents, and will concentrate their efforts, as far as local work is concerned, on assistance to selected communities which can be used as demonstrations.

To cover all phases of extension work in rural social organization would require a larger staff than probably will be available for years to come. The program for any State will, therefore, be determined by the local needs and by the personality and qualifications of the worker. Professor Arvold has done a work in rural dramatics in North Dakota which would be entirely impossible for most of us. But each of us has special ability in some line, and if we know how to utilize the services of others who have the technical training needed, we can accomplish much.

Extension work in rural social organization should be not merely rural welfare work, but should seek to inculcate enlightened social attitudes among rural people with regard to the possibility and desirability of human progress; it should develop organizations which will be permanent because they are based upon sound policies and procedure; it should seek to give rural people exact knowledge concerning the conditions and processes of rural life and to arouse a controlling desire for the highest values in life. The extension specialist in this field should be at once a social evangelist and a clinical expert. He must have a sympathetic appreciation of the

attitudes of his constituency so that he can stimulate their desire for the best of life, yet at the same time he must view his problems objectively and attack them with a truly scientific method, if his work is to be permanently constructive.

TUESDAY AFTERNOON, NOVEMBER 8, 1921

The report of the Committee on Extension Organization and Policy was submitted by the chairman of the committee, L. A. Clinton, Director of Extension of New Jersey, as follows:

#### REPORT OF COMMITTEE ON EXTENSION ORGANIZATION AND POLICY

A meeting of the Committee on Extension Organization and Policy of the Association of Land-Grant Colleges was called at Indianapolis in December, 1920. A session was held with representatives of the States Relations Service and the Extension Committee of the American Farm Bureau Federation. The matter of relationships was discussed and recommendations made for the appointment of a farm bureau committee on extension work in every State. It was definitely recognized that the extension forces should confine their activities to educational work and should not become organization agencies for any association. A memorandum more clearly setting forth the responsibilities and relationship between the extension service and the farm bureau was later signed by Dr. A. C. True of the United States Department of Agriculture, and President J. R. Howard for the American Farm Bureau Federation. We urge upon extension directors and extension agents the importance of observing the terms of this memorandum and of giving publicity within their States to its terms. Especially should consideration be given to the following statement in the memorandum:

"Since these county extension agents are part of a public service as defined in the Smith-Lever Act, and receive some part of their salary from public funds, they are to perform service for the benefit of all the farming people of the county, whether members of the farm bureaus or not, and are to confine their activities to such as are appropriate for public officials to perform under the terms of the Smith-Lever Act. The county agents will aid the farming people in a broad way with reference to problems of production, marketing and formation of farm bureaus and other co-operative organizations, but will not themselves organize farm bureaus or similar organizations, conduct membership campaigns, solicit membership, receive dues, handle farm bureau funds, edit and manage the farm bureau publications, manage the business of the farm bureau, engage in commercial activities, or take part in other farm bureau activities which are outside their duties as extension agents."

It is to be expected that as the farmers become more efficient in handling their own business through cooperative enterprises, certain business interests will be affected and will seek to discredit the county agent and his work through which, at least in part, the increased effectiveness of the farmers has been brought about. It is considered by your committee especially important that county agents and the cooperating county organizations of whatever name, should be informed of the attacks which are being made upon the county agent system, and that special care be exercised to direct the county agent's work along educational lines which may include marketing information as well as that of production.

#### SPECIALISTS

A fundamental principle underlying extension work is that the agricultural college and experiment stations and United States Department of Agriculture have something to extend. If this principle is correct, it then makes necessary the employment of subject-matter specialists who shall represent the subject-matter departments of our colleges and stations and the United States Department of Agriculture, and who shall assist the county agents in organizing and forwarding their subject-matter programs. These specialists are absolutely necessary to the success of county agent work, and to all cooperative extension work. We recommend that in reports of accomplishments the work done by specialists shall be recognized, and their place in the organization shall be clearly shown.

#### CONFERENCES

National and regional conferences of administration officers in extension work have been held annually or at frequent intervals. When plans were being formulated and policies were being established these frequent conferences made for uniformity of purpose and for a clearer understanding of administrative duties.

But little opportunity has so far been given for subject-matter specialists to confer. During the past year the subject-matter conferences held by clothing and nutrition specialists seem to have been of great value. Your committee would recommend that special consideration be given by the Executive Committee to the advisability of holding a limited number or regional conferences of subject-matter specialists during the coming year.

#### DEMONSTRATIONS AS A BASIS OF EXTENSION WORK

It is evident that the Smith-Lever Act clearly intended that actual demonstrations in the field and in the home should constitute the basis of the educational work under that act. It would possibly be well in every State to make an analysis of extension work in agriculture and home economics for the purpose of determining to what extent that work is merely a talking program, and to what extent it is based on actual demonstrations. The demonstration program is one on which all agencies may and should unite. Cooperative extension work should not be county agent work, nor home demonstration agent work, nor boys' and girls' club work, nor even work of the specialists, but it should be work designed for the improvement of practices in agriculture and home-making in which all these agencies may unite, all working for the carrying out of one program based upon the needs of the community.

#### FARMERS' MEETINGS AND FARMERS' INSTITUTES AND SHORT COURSES AT THE COLLEGE

Farmers' institutes had been a means of imparting information in agricultural and home economics long before the passage of the Smith-Lever Act. In the interpretation of work which could properly be financed with Smith-Lever funds the farmers' institute as generally conducted was ruled out. The farmers' institute, while partly informational, usually was unaccompanied by any follow-up work, and the instruction was seldom

based upon the results of demonstrations in the community. This older type of farmers' institute has largely been replaced by farmers' meetings held under the auspices of the county agents and the extension forces. The programs have become more definitely educational, deal with more specific subjects of direct relationship to the practice of the community and are usually accompanied by follow-up work. We would recommend that where these programs are based upon actual community needs and are supplemented by demonstration work being conducted under approved projects, the United States Department of Agriculture consider such meetings as proper Smith-Lever work.

#### THE EXTENSION SCHOOL

The extension school of two weeks' duration or less has been recognized as a proper Smith-Lever extension activity when held anywhere in the State except at the college. Early interpretations of the Smith-Lever Act were to the effect that under its terms short courses could not be held at the college. Your committee is of the opinion that the farmers' short course at the college of not to exceed two weeks in duration is not prohibited by the Smith-Lever Act. These short courses are not given to resident students but are truly extension courses which might properly be given at any point in the State as well as at the college. The college equipment is such as to make it especially desirable that farmers should not be deprived of the facilities offered by the institution in forwarding extension work. We recommend that the Executive Committee of this association consider this matter with the Secretary of Agriculture with a view to getting a modification of the early rulings on short courses at the college.

L. A. CLINTON,  
W. W. LONG,  
G. I. CHRISTIE,  
R. S. WILSON,  
THOMAS BRADLEE,  
K. L. HATCH,  
*Committee.*

After considerable discussion the report was amended and adopted as given above.

#### ELECTION OF OFFICERS

The following officers were elected for the ensuing year: Chairman, T. O. Walton, Director of Extension of Texas; secretary, C. F. Monroe, Director of Extension of New Mexico.

WEDNESDAY AFTERNOON, NOVEMBER 9, 1921

This was a joint session of the three sub-sections of the Section of Agriculture, devoted to matters related to agricultural extension.

The following paper by W. F. Handschin, Vice-Director of Extension of Illinois, was presented:

## THE RELATION OF AN EXTENSION PROGRAM TO THE WORK OF AN EXPERIMENT STATION

BY W. F. HANDSCHIN

In considering the relationship of an extension program to the work of an experiment station the following three aspects of the problem are of particular importance:

(1) The necessity for building the extension program on investigational studies and research.

(2) In the event the station has not conducted investigations in the extension fields, what should be the policy of the extension service in entering such fields of work?

(3) The relationship of station workers and extension workers in the consideration and development of new projects for investigation.

These questions furnish adequate scope for the discussion of some of the most fundamental problems involved in research and extension work.

The necessity for developing our extension activities on the basis of facts and sound judgment is assumed to be self-evident. The commonly accepted conception of extension work assumes that there is available such information, not as yet incorporated in our ordinary farming procedure, as is worthy of extending into more general practice.

A somewhat brief examination of the contribution which research institutions like the agricultural experiment station can make toward improving agricultural practice, has brought out two outstanding facts: First, that in spite of the great value of the empirical knowledge gained through the centuries, most of the improved practices necessary to success in our modern agriculture are based very largely, either directly or indirectly, on definite investigational work; and second, that a large proportion of the information resulting from our investigational work is already being used by the most progressive farmers in nearly every important farming region to which the information is applicable.

In order to appreciate how largely good farming practice is based on investigational work we need only to study the matter at a few important points. For illustration, our whole procedure for maintaining and improving the fertility of our soils—one of the most fundamental of all agricultural and social problems—rests very largely upon definite chemical and biological investigations made almost entirely within the past two generations. The economic maintenance of soil nitrogen and the providing of inexpensive nitrogenous feeds for our farm animals are made possible because of the investigations by Hellriegel which led to the discovery of the nitrogen-fixing bacteria in our legume crops. This epoch-making discovery dates back only to 1883. The economic feeding of farm animals is based to a very large extent on specific investigations in animal nutrition, conducted almost entirely within the past 60 years. The improved varieties and breeds of crops and animals adapted to our modern economic conditions are in no small measure the result of investigations designedly planned to produce more efficient plant and animal material. And so on all through the list, we find that, even though, here and there, individual farmers and breeders have achieved notable success largely by means of empirical methods, in the great majority of cases where farming methods have been improved at some particular point, such improvements trace

either directly or indirectly to one or more definite investigational projects conducted by formal research institutions.

If it be true, as I believe it to be in general, that our most progressive farmers in nearly every community are making conscious effort to keep abreast of the most recent discoveries made by our research institutions, it must necessarily follow that the extension program will be essentially different from one which is based on the assumption that nearly all of the information for the improvement of agriculture is still largely confined within the walls of our research institutions.

On the basis of a reasonable amount of contact with the State colleges and farmers of the middle western States during a period covering nearly twenty years, the writer has been unable to find that there is much information of real value to agriculture in the hands of the research institutions, which has not been incorporated to a considerable extent in the practice of the best farmers in nearly every important farming region. Not only general observation, but a vast amount of investigational data derived from farm business surveys and other economic studies in nearly all sections of the country, indicate clearly that an encouraging proportion of the farmers in every region studied are making fairly good use of the best information available. This is attested not only by the fact that they are making profits much above the average of their respective communities but by the analyses of their farm business showing the results obtained in the development of the four or five essential factors necessary to the most successful operation of a farm in the particular region under consideration.

The writer does not at all share the view that there are vast stores of valuable information locked up in cold storage at our State colleges, or in the research refrigerators of the United States Department of Agriculture. He holds, rather, that the information of real value is in the main already in transit, either being tested out by the most progressive farmers in the regions to which the information is thought to apply; or it has already become standard practice, with such modifications as the farmers have found desirable, on a considerable number of farms. Except in the case of the most recent findings, not yet thoroughly tested under field conditions, the problem, from the standpoint of developing the extension program, seems to be concerned mainly with trying to extend into more general practice the improved methods already somewhat established on the farms of the best farmers in a large proportion of our farming communities, rather than with trying to rescue valuable research information from cold storage before it shall have deteriorated under the chilling process until it is valueless from the standpoint of economic application.

It is largely because of the fact that most of the scientific information developed by the research institutions, was already to a considerable extent incorporated in actual farming practice, that the extension movement has made such outstanding progress since its nation-wide inception following the passage of the Smith-Lever Act in 1914. This unparalleled progress in extending improved methods in agricultural production into actual farming practice, has been made possible, largely because of two facts: First, because a large proportion of the research information developed had already been tested out under field conditions and adapted to economic experience, and second, because the improved practices based on investigational data furnished the logical foundation for demonstrating

such improved practices in the most effective manner. That is, demonstration material in the form of already established practice on nearby farms, usually within the county, often in the immediate community, not only helped to convince the farmer but made definite progress in overcoming inertia and meeting possible criticism substantially easier for him. Farmers hesitate less in accepting new practices when some one in the community has already blazed the way.

I would not be understood to assume that we can find in every community already established in actual practice, all of the demonstration material necessary to carry on the various projects undertaken in an extension program. I believe, however, that we have in general fallen far short of making the most of such material already at hand. The organization of every extension project, should include, as a part of the preliminary plan, a careful survey of the county or other unit under consideration. Such a survey should locate all of the demonstration material in the area and serve as a basis for its further development or the location of such new demonstrations as are necessary to the adequate development of the project.

Even in the more complicated aspects of the farming problem dealing with economic relationships, such as farm organizations, cost of productions, and the determination of the net profits for the entire farm business, it is possible to locate in almost every community good demonstration material without devoting an undue amount of time and energy to the study.

Experience in Illinois as well as a number of other States has demonstrated that a simple farm accounting project carried on with 50 or more farmers in a county, furnishes a good basis for some excellent demonstration work in the more efficient organization and operation of farms. Where a reasonable amount of investigational data in farm management are available for the different farming regions of a State, even one year's results from the simple farm accounting project offers a satisfactory basis for some good demonstration work in farm organization. Where little or no investigational data are available, the number of simple farm accounts kept should be not less than 100, and two or three years' results rather than one should be available before any farm management demonstration meetings or tours are undertaken. A few facts from our Illinois experience will illustrate how the plan works in practice.

In September of 1920 a farm management tour was arranged by the county agricultural agent of Woodford County and the farm management specialist of the college to visit six out of 23 farms which had kept simple farm accounts continuously since 1916. The same farms were visited again in September 1921, and the principle facts regarding their organization, operation, financial returns, and general system of farming for the five-year period were studied. The fact that nearly all of the 150 farmers who went on the tour continued throughout the day and gave painstaking attention to the study of the different farms visited shows that the project is "getting across" with the people whom it was planned to reach. Over 140 farmers in the same county are keeping simple farm accounts this year. The information already made available by this project, which has occupied only a small fraction of the time of the county agents, is in my judgment of the most fundamental importance in helping to solve the

present difficult economic problems as they present themselves to the farmer of central Illinois.

That the extension program needs to be built on the most accurate information obtainable, whether derived from formal research activities or from other sources, seems to permit of no argument. What is more important is that we develop more fully the means of allocating such information as is of value in the solution of various agricultural problems. We need also to work out more accurate means of evaluating the data and other information available from the standpoint of its application to practical farming conditions, where the economic return for the farm as a business unit, rather than that of a single crop or annual enterprise is the final criterion. Fortunately this is always being done to a considerable extent by the more progressive farmers. We need only to develop the means of collecting and interpreting the facts of their experience.

This brings us to the second phase of our problem, i. e., in event the station has conducted no investigations in the extension fields, what should be the policy of the extension service in entering such fields of work? Two possible policies suggest themselves in answer to this question. The extension service may do nothing, or it may proceed independently of any research department until such time as it may be possible to undertake formal investigational work. Neither of these policies appears to me satisfactory, however. No extension service worthy of the name can afford to "do nothing" with reference to any really important agricultural problem. To be sure, an extension department may decide that it will undertake no projects in a particular field because no research information is available, but the facts of field experience prove conclusively that the extension worker on the firing line does actually do something about the really pressing demands of his constituency whether or not he has a formal project covering the work or is supplied with research data.

It may be fairly easy to ignore requests for assistance on matters of minor importance. In fact if the extension worker undertakes only such of the really important problems as he can successfully pursue, the minor problems will automatically fall into the background. When it comes to dealing with the more fundamental problems, however, especially those in which there is popular interest, my observation leads me to believe that the extension worker, especially the county agent, does actually do something about them. He makes judgments, gives advice, or becomes active in the campaign to solve the problem or remedy the difficulty confronting his constituency. For illustration, we need only recall our recent experience in connection with the insistent popular demand for better methods of marketing farm products. This is a good example of an interest in which we have relatively less research activity than in many of the older and better established fields. Because of this fact many of our extension workers and others representing the farmer have leaped to the conclusion that no information having any practical application to the question was available and that the whole question must be solved anew.

As a result of this assumption, we have had all manner of marketing schemes proposed. Many of them in direct violation of economic laws almost as immutable as the physical law of gravitation itself. In fact the experience of some of the marketing plans already put into practice has demonstrated fully that many of the most grievous mistakes made might



easily have been avoided had those responsible for projecting such plans been willing to avail themselves of the well established and widely understood economic facts and principles bearing on the problem.

My point is that we frequently do make use of the basic information available in many of the fields closely allied to those in which the extension problem presents itself. The remedy for this difficulty, so far as there is a remedy, lies in improving and broadening the fundamental training of both our extension specialists and the members of our research staff, and in developing the highest possible coordination and cooperation between the specialists and the investigator.

We shall never be able to answer all of the important questions coming in from the field on the basis of definite formal investigations carried on by our research institutions. In fact many really important problems do not readily, if at all, lend themselves to formal investigation; certainly not within the scope of the resources in men and money available to our experiment stations and other research institutions. Nor do I see any substantial relief for this situation in the future. With the present extension organizations in the field and the ever increasing contacts between the farmer and his research institutions, we shall always have more important problems presented to us than we can possibly solve on the basis of specific investigational projects.

We can not ignore all such requests for assistance merely because we do not have available data which specifically answers the question. We must have the courage, more and more, to make answer to such inquiry on the basis of the best judgment of the research worker in the particular field involved; working in close cooperation with the extension specialist, the county agent, the successful farmer, or anyone else who has a basis for sound judgment in the matter.

I would be the last to minimize the great value of investigational data and the first to encourage in every feasible way research activities on the broadest possible scale, but when a really important question which we can not answer specifically on the basis of investigational data presents itself, I would have it answered on the basis of the best judgment which can be made in the matter after giving it the most careful consideration possible. In my judgment neither the investigator nor the extension worker should voluntarily give advice in matters in which he does not have specific and definite information. When the farmer puts important questions to his research institutions, however, I believe he is entitled to the best judgment of those who are most competent to make answer to them.

As a matter of general policy, I believe the extension program should lay major stress upon such important lines of work as can be developed on the basis of a considerable amount of investigational data bearing on the problem. This will more nearly insure sound procedure and furnish the basis for securing worthwhile results in the shortest possible time, both of which are of primary importance in the development of a vigorous and effective extension program.

The answer to the third question to be discussed, i. e., what shall be the relationship between the station worker and the extension worker in the consideration and development of new projects for investigation? has

been anticipated to some extent in the discussion of the two previous questions.

It is evident, in considering the various problems which might profitably be investigated by the station worker, that he will have large opportunity for selection. In practically every one of the recognized fields of research there are many more problems of fundamental importance than can possibly be developed by the men and resources at hand. The selection of the problems, therefore, becomes to a large extent, a question of not what is worthwhile but what is most worthwhile undertaking within the possibilities of the resources available for conducting the work. That is, in order to develop a research program which shall most nearly meet the fundamental needs there must be a job analysis based on the most important agricultural facts concerning the State or farming region. But further than this, consideration must be given to the whole question of competing areas, world markets, and general economic tendencies.

In planning such a research program, it is evident that the investigator, particularly in certain lines of research, must work in close cooperation with the extension forces if he is to have the most comprehensive basis for a wise selection of investigational projects. However, the station worker can not be always guided by outside demands in selecting his projects and the final selection of such projects must be made by the investigator and not by the extension forces. Nevertheless, he is a wise man who in selecting research projects gives careful consideration to the facts of field experience and keeps in close touch with the broad tendencies affecting the production and distribution of agricultural products.

In the development of the investigational projects selected, the extension forces can frequently be of great assistance in keeping the station worker informed regarding field experience bearing on the project. This is particularly true of investigations in the control of plant and animal diseases and insect pests. It is also true to a considerable extent of investigational work in crop production, agricultural economics, farm management, and animal husbandry.

When the investigator is ready to test out his findings on the basis of actual economic experience in the hands of the farmer, the subject-matter specialist and the county agent can often be of real assistance to him. While some may hold that this phase of the work is extension rather than research, I think we should interpret research broadly enough to include not only the testing out of the new ideas developed in the laboratory, the feed lot, or the station plot but in testing their application to the economic conditions of the farm itself. Once this is done and the conclusion reached that the new idea is ready for general introduction the matter is ready for extending into general practice as rapidly as is thought desirable.

In summing up the three phases of the problem discussed it seems only logical to conclude that the research and extension programs of the State college must be developed on the basis of the most complete coordination of the two branches of the service and the most painstaking cooperation between the two groups of workers concerned. The experiment station is the production plant and the extension service the machinery for marketing the product. We must have both efficient production of the kind of information the farmer needs and a scientifically developed sales

organization which will put the goods into actual use by the consumer, if we are to get maximum results.

The following report was presented by Dean A. R. Mann, New York State College of Agriculture:

**REPORT OF JOINT COMMITTEES ON RELATIONSHIPS BETWEEN EXTENSION AND VOCATIONAL EDUCATION FORCES IN THE VARIOUS STATES**

At their annual meetings in 1920, both the agricultural section of the National Society for Vocational Education and the Department of Rural Education of the National Education Association voted independently to create committees to prepare working programs for Smith-Lever extension and Smith-Hughes vocational forces in the various States. The committee appointed by the National Society for Vocational Education was subsequently asked to serve also as the committee of the Department of Rural Education of the National Education Association. Its report was submitted to both of these societies at their annual meetings at Atlantic City, in February, 1921. This report dealt only with relations in the vocational field, omitting all consideration of the problems involved in the prevocational field. In the discussion of the report it was brought out that while the committee had in its membership persons engaged in the direction of extension work, invited to serve by the National Society for Vocational Education, there was need for fundamental discussion of certain problems by persons officially designated by the Association of Land-Grant Colleges, before which body, also, any report which was to have official standing should be presented. Accordingly, the committee's report at Atlantic City was accepted as marking progress, and resolutions were passed by both bodies requesting the creation of joint committees of the Association of Land-Grant Colleges, of the National Society for Vocational Education, and of the Department of Rural Education of the National Education Association, for the further consideration of the whole matter in its broadest aspects. It was learned later that the Association for the Advancement of Agricultural Teaching had also appointed a committee, which, for more than a year, had been at work on the problem, and this committee was asked to sit with the joint committees above referred to.

Because of the outstanding importance to the country at large that there shall be developed a well-rounded, thorough-going, and harmonious program for the promotion of the vocation of agriculture and home-making—a task inviting the highest abilities of both the extension and the vocational forces—there was need to see the field in its entirety and to propose such adjustment of relations within it of the two great agencies created by law to do the work as would leave no gaps and would assign to the extension and to the vocational forces the phases of work for which they, respectively, are best fitted and which comply with the clear intent of the laws. The highest service in this great field will spring from a spirit of copartnership, of mutual respect, and from intimate association on a clearly defined basis, with the single purpose of serving the complete vocational needs of the communities. When both of the agencies shall have been fully developed on a carefully adjusted basis, there will be large place for them both in every community.

The committees have taken as their starting point the cooperative extension, or Smith-Lever Act of 1914, and the Vocational Education, or Smith-Hughes Act of 1917, as these acts are national in scope, they have been accepted and approved by the legislatures in all the States, and they impose certain common obligations on the agencies charged with their respective administration in the States. While, in their major aspects, the objects and methods provided for in these acts are clearly distinct and separate, there are other aspects in which the functions are less clearly distinguished, making possible parallelism and overlapping, unless the respective spheres of activity are determined by agreement between the officers responsible for the administration of the two acts within the several States, and unless such agreement is faithfully observed in a spirit of mutual respect and helpfulness. The problem is further complicated by the great diversity in State laws respecting functions assigned to the land-grant colleges, on the one hand, and to the State boards or departments of education, on the other hand. These latter complications make it impossible to draw a general memorandum of understanding which will fully apply in all the States. In the majority of States there will need to be special agreements, based on existing legislation in the States.

On February 21, 1918, there was sent to the directors of extension and to the State boards for vocational education a "Memorandum on Instruction in Vocational Schools and Extension Work in Agriculture," being a copy of an agreement "approved February 15, 1918, by a joint committee of the Department of Agriculture and the Federal Board for Vocational Education." This memorandum has been accepted as the basis for establishing special working agreements in the States. It is as follows:

"February 21, 1918.

**"MEMORANDUM ON INSTRUCTION IN AGRICULTURE IN VOCATIONAL SCHOOLS AND  
EXTENSION WORK IN AGRICULTURE"**

"In order that those who are concerned with the administration of agricultural extension work and those who are concerned with administration of vocational agricultural instruction may cooperate for the purpose of assisting in securing for this country an effective system of agriculture, the following statements are made:

**EXTENSION WORK IN AGRICULTURE**

"The United States Department of Agriculture, in cooperation with the land-grant colleges, has organized an agricultural extension system which extends throughout the United States. This has been done in accordance with a series of acts of Congress authorizing the establishment of such work and making appropriations therefor. This extension work consists of practical demonstrations, and the dissemination of information among men, women, and children through the personal work of county agents, home demonstration agents, boys' and girls' club workers, and others. This work covers the various branches of agriculture and home economics, including marketing and rural organization. It is supplemented by the widespread distribution of publications of the United States Department of Agriculture, the experiment stations, the agricultural colleges, and State departments of agriculture. The instruction and information used in this system of popular education is based chiefly on the work of the United States Department of Agriculture, the State agricultural colleges, and the experiment stations.

"This extension work is not a systematic course of instruction but deals with problems of practice and business on the farm, in the home, or

in the rural community. This is expressed in the following quotation from the Smith-Lever Act: 'To aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics and to encourage the application of the same.'

"As the extension system becomes general and settles down in any community, it deals more and more with special problems of the farm and rural community rather than with the details of practice with which the farming people are generally familiar. Backed by the research system of agricultural colleges and the United States Department of Agriculture, it brings to the people the new things which have been found worthy of broad trial in actual practice.

#### VOCATIONAL AGRICULTURAL INSTRUCTION

"The creation of the Federal Board for Vocational Education and a State board for vocational education in each State, under the provisions of an act of the Sixty-fourth Congress, approved February 23, 1917, makes possible a nation-wide organization for the administration of vocational education. The act carries an appropriation for salaries of teachers, supervisors, and directors of agricultural subjects. The money so appropriated is to reimburse schools for expenditures for salaries of teachers to carry on instruction in vocational agriculture or for the salaries of supervisors of such instruction.

"Certain standards must be set up by the State board and approved by the Federal board for schools in which these Federal funds are to be used. These standards include qualifications of teachers, minimum amount for maintenance, the minimum plant and equipment, and courses of study. In case any of the fund is to be used for salaries of supervisors or directors, a plan of supervision for the State must be set up by the State board with the approval of the Federal board.

"This act makes provision then for a course of systematic instruction in agriculture carried on in schools and classes under a definite plan of cooperation between a State board and the Federal board. This systematic instruction in agriculture, however, under the terms of the act must in every case include at least six months of supervised practical work.

#### RELATIONSHIPS

"In many counties of the various States there will be the cooperative agricultural extension system conducted by the State agricultural college in cooperation with the United States Department of Agriculture and the county under the provisions of the Smith-Lever Extension Act and under other Federal and State legislation. There will also be vocational agricultural instruction carried on by the State board for vocational education in cooperation with the Federal Board for Vocational Education and the county or the local school district under the provisions of the Smith-Hughes Act. Both the extension service and the vocational instruction will deal with both adults and children.

"In each State there is a State director of agricultural extension service and an executive officer of the State board for vocational education. It is suggested that these two officials determine upon a plan of cooperation for the State based upon the following general policies or principles:

(1) "It is to be understood that all agricultural extension work should be administered by those in charge of extension activities in the State and that all vocational education in agriculture should be administered by those in charge of the vocational schools in the State.

(2) "That all extension work with adults done by teachers in vocational schools be in accordance with the plans of the extension system for the State, and in cooperation with the agent who is in charge of the administration of the extension work in the county.

(3) "That in counties having vocational schools of agriculture the extension service will conduct its extension work in agriculture with children chiefly through the organization of clubs for the carrying on of definite

pieces of work for the improvement of agricultural practice. The practical agricultural work of the schools will chiefly consist of home project work by the students as a part of the systematic practical instruction provided by the Smith-Hughes Act. It is advised that in such counties a cooperative agreement be made between the extension authorities and the school authorities whereby it will be arranged for the teachers of agriculture to take part in the extension activities with the children within the territory of the school and that such territory be set forth in the agreement.

(4) "That in every case care be taken to see that work which is supported by Federal funds under any of the aforementioned acts will not in any way duplicate or overlap work being carried on in that same community when that work is supported in any part from another Federal fund.

Approved February 15, 1918, by joint committee of the Department of Agriculture and the Federal Board for Vocational Education."

In the light of subsequent experience, your committee offers the following explanations and interpretations of the foregoing memorandum, as tending to facilitate sound and harmonious adjustments within the States.

#### EXTENSION WORK

The term "extension" work shall be understood to include, aside from special duties assigned by State laws in the several States, cooperative agricultural extension, as defined and provided for in the Smith-Lever Act of May 8, 1914, accepted by the legislatures in the several States. The law provides that such extension work "shall consist of the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or resident at said colleges in the several communities and imparting to such persons useful and practical information on said subjects through field demonstrations, publications, and otherwise, and to encourage the application of the same."

*Methods or types of extension teaching.* The extension teaching is as a rule, conducted by means of cooperative projects with the county farm bureaus and other local agencies or groups. These projects are agreed upon between local members of the farmers' organizations and the specialists in the extension service of the college of agriculture. They are then carried into effect, usually by the following and other methods:

(1) Cooperative demonstrations given in fields and barns and other appropriate places.

(2) Lectures and addresses before public meetings, including community meetings, meetings of general groups, and meetings of special groups.

(3) Extension schools, in which instruction in subject matter of immediate practical interest is given over a period usually from three to five days in length, and seldom exceeding two weeks, in the localities where the students reside. Short courses or schools held at the agricultural college may be of any length required by the work to be done.

(4) Exhibits at fairs, expositions, and other local and state-wide meetings, at which subject-matter is graphically presented.

(5) Supplying technical subject matter through bulletins, leaflets, special memoranda, outlines, and other means.

(6) Junior extension, or boys' and girls' club work, which is the giving of instruction in, and the dissemination of useful and practical information

concerning special problems of immediate economic importance to the agriculture and home making of the several communities, to boys and girls. This work is done by means of definite projects, conducted, as far as possible, at the workers' homes, under the supervision and direction of a competent leader, and by lectures, demonstrations, bulletins, circulars, correspondence, and personal visits. It involves the actual selection of a definite line of work by the worker. It presupposes that the planning, the keeping of an accurate cash and labor record, and, as far as may be possible, the manual labor will be done by the project worker and that he will pursue a definite line of reading and study in relation to the project.

(7) Aid in meeting special problems of individual farmers.

(8) Conferences with county officers and representatives to arrange, organize, and supervise demonstration and other work.

The State extension service at the college of agriculture is responsible for the organization and administration of all forms of effort defined herein under extension work.

#### PUBLIC SCHOOL EDUCATION IN AGRICULTURE AND HOME ECONOMICS

Public school education in agriculture and home economics aims to give an appreciation of the things of agriculture and home making, to develop acquaintance with the occupations, and to provide training in the elementary processes and practices requisite to wise selection of, and efficient work in, the vocations of agriculture and home making.

*Agricultural instruction.* Three types of agricultural instruction of less than college grade may be offered by the public schools: (1) Pre-vocational agriculture in the grades, with or without supervised practice; (2) general agriculture in high schools, with or without supervised practice; (3) vocational agriculture.

(1) Prevocational agricultural education is construed to mean the instruction offered as part of a general education in the grades to pupils the majority of whom are less than fourteen years of age.

(2) General agricultural instruction, for students regularly enrolled in the high school, includes work in any of the phases of agriculture.

(3) Vocational agricultural education shall mean that education of less than college grade, which is designed to meet the needs of pupils fourteen years of age, or over, who are regularly enrolled for systematic instruction under the supervision of the schools and who intend to follow agricultural pursuits, and which gives the knowledge and skill necessary to the control of plant and animal production to the end of economic profit, and which is, furthermore, to articulate with other education so as to promote a desirable type of farm and community living.

By systematic instruction is meant instruction in regular, organized classes which meet at reasonably frequent intervals, at given centers, to pursue a consecutive series of lessons involving lectures and laboratory work. Systematic instruction specifically excludes general farmers' meetings, farmers' institutes, and extension schools of two weeks or less duration.

The organization for this work may include such provisions as the following, given in high schools and in special schools or classes:

(a) Four-years course. This course is designed for pupils regularly enrolled in the school who desire to pursue a four-year high school course in agriculture.

(b) One-, two-, or three-year courses. Such courses are designed for persons who wish to enter school to study agriculture for a shorter period than the full high school course.

(c) Short-unit courses. Such courses are designed to meet the needs of persons who have left school and who desire to enroll for instruction in special phases of agricultural production during the season when farm work is slack. These courses will normally extend over a period varying from two weeks to three months, and will be offered either at the school or in a community center tributary to the school.

(d) Evening classes. Such classes may be organized to meet the needs of persons engaged in farming who desire systematic instruction in special phases of their work. Instruction will be conducted by means of discussions, lectures, and demonstrations, and will usually be given one or more evenings a week for a period of several weeks.

(e) Part-time classes. Such classes are designed primarily for boys fourteen years of age or over, who are not enrolled in the above classes.

*Home economics instruction.* Three types of home economics instruction of less than college grade may be offered by the public schools: (1) Prevocational, in the grades; (2) general courses, in high school; and (3) vocational.

(1) Prevocational home economics instruction is construed to mean the instruction offered as part of a general education, in the grades, to pupils the majority of whom are less than fourteen years of age.

(2) General home economics instruction, in the high school, includes work in any of the phases of home-making.

(3) Vocational home economics education is that education of less than college grade, conducted as part of the public school system of the State and under the direction of the school authorities, which is designed to meet the needs of persons fourteen years of age, or over, who are regularly enrolled for systematic instruction, as defined in this report, in the science of, and practice in, the activities connected with the vocation of home making.

The organization for this work may include such provisions as the following, given in high schools, and in special schools or classes:

(a) Four-year high school course. This course is planned for persons who desire a thorough training in the science and practice of home-making. Girls enrolled in the courses are usually required to conduct supervised work, which is closely correlated with the class and laboratory instruction.

(b) One-, two-, and three-year home-making courses. Such courses are planned for girls who desire instruction in the science and practice of home-making of less than full high school length.

(c) Part-time home-making courses. Such courses are designed primarily for girls fourteen years of age or older, who are not enrolled in the above courses, but who desire definite, systematic instruction, totalling a minimum of 144 hours.

(d) Evening home-making courses. Such courses are intended for women who are engaged in home-making activities or who are employed in any capacity during the day. They are planned to train women in any of the essential occupations connected with home-making. They involve systematic instruction in regular, organized classes.

The State board for vocational education is finally responsible, subject to approval by the Federal Board for Vocational Education, for the or-



ganization and administration of all forms of effort defined herein under vocational education.

#### BASIS FOR AGREEMENTS IN RELATED FIELDS OF WORK

It is recognized that the functions, obligations, and responsibilities of the parties to the agreement, as defined by law, may be similar, with the possibility of overlapping, as in the fields of (1) the junior project work of the schools and the junior extension (boys' and girls' club) work of the college both in agriculture and home economics, (2) the part-time and evening home-making courses of the State board for vocational education and the home economics extension work of the college, and (3) the short-unit courses in agriculture and home economics, in the public schools, and the extension classes conducted by the land-grant colleges. In a spirit of fairness to both groups of interest, this report seeks to present a basis for clear differentiation of the functions of the respective agencies in these closely related tasks. It is proposed that the work in these related fields shall be made a matter of cooperative agreement in the several States. Such cooperative agreement should recognize the following facts and principles:

(1) It is the function, duty, and responsibility of the public school to provide education for all children, and to provide such adult education as is authorized by law.

(2) Under the law, it is the function and duty of the land-grant college of agriculture to maintain extension service. The theory underlying extension service is that it is, first, to provide supplemental education for persons engaged in agriculture and home-making, and, second, to enable the college and the Federal Department of Agriculture to bring their advances in knowledge to farmers and their families who can make the applications. Furthermore, by virtue of its staff of technical specialists and its responsibility for training vocational teachers, the land-grant college is in a position to furnish technical information and advice in the fields of agriculture and home economics to vocational work in the schools.

(3) It is clearly recognized and affirmed that the college of agriculture is the source and authority, in the State, in technical subject matter in agriculture and home economics. The principle should be clearly observed that neither the State nor any lesser administrative unit charged with the supervision of vocational education, should employ any itinerant subject-matter specialists for the purpose of giving technical instruction in any phase of agriculture or home economics. In so far as the vocational schools may have need for the assistance of technical specialists other than the regular vocational teacher or teachers in the local schools, they should look to the college of agriculture to supply such specialists. If, by reason of limitation of funds, the college is unable to meet all demands for aid on technical matters, the remedy is to be found in strengthening the resources of the college to fully meet the requirements, and not in establishing subject-matter specialists as part of the State vocational system.

(4) There are three types of situation to be considered: (a) Where agricultural and home economics education is fully developed by the local schools, (b) where such education has not yet been undertaken by the local schools, (c) where such education is in process of development by the local schools.

(a) Where the school provides a comprehensive program of agricultural and home economics education which meets the needs of children and adults, through systematic instruction and supervised practice, the extension forces of the land-grant colleges shall not duplicate such work of the schools, but shall rather cooperate with the schools by providing, on request, subject matter, special lectures, conferences, and other similar services. This shall not be interpreted to limit the freedom of the extension forces to prosecute their extension work through local organizations of farmers.

(b) Where the school does not provide such a program of instruction in agriculture and home economics, the extension service of the college should organize extension work. In such localities, the school should give its fullest support and cooperation to the extension workers.

(c) It is recognized that, in some places, schools will be in the process of developing such educational programs. In these cases, the following principles should apply: Extension workers should confine their work with children to those whom the school does not enroll in systematic vocational or prevocational project work, including supervised home practice; unless requested or authorized by school authorities to enroll them. The school should organize its work with adults to provide systematic vocational instructions as defined herein. The school should offer its facilities to the junior extension worker wherever the school has not, in reasonable operation, vocational or prevocational project work accompanied by supervised home practice.

(5) Before undertaking junior extension work in any county, the extension division should submit in writing to the county superintendent of schools, the plans proposed for junior extension in that county, and should endeavor to arrange for a basis of understanding and cooperation. Copies of plans, when agreed upon, should be filed with the State department of education for consideration, before being put into operation.

(6) The State department of education should look to the land-grant college to furnish technical subject matter in agriculture and home economics in the form of outlines, leaflets, and bulletins for use in the public schools. It is understood, however, that no such material in agriculture and home economics should be used in the schools until approved by the State department of education.

(Signed)

Committee of the Association of Land-Grant Colleges:

H. A. MORGAN, Knoxville, Tenn.  
 BRADFORD KNAPP, Fayetteville, Ark.  
 L. A. CLINTON, New Brunswick, N. J.  
 G. I. CHRISTIE, Lafayette, Ind.  
 A. R. MANN, Ithaca, N. Y., Chairman.

Committee of the National Society for Vocational Education:

ANNA A. KLOSS, Boston, Mass.  
 F. W. KIRKHAM, Salt Lake City, Utah.  
 L. H. DENNIS, Harrisburg, Pa., Chairman.

Committee of the Department of Rural Education of the National Education Association:

AMY KELLY, Boise, Idaho.  
 L. S. IVINS, Kent, Ohio.  
 F. W. KIRKHAM, Salt Lake City, Utah, Chairman.

Committee of the American Association for the Advancement of Agricultural Teaching:

F. B. JENKS, Burlington, Vt.  
 L. S. IVINS, Kent, Ohio.  
 W. H. FRENCH, East Lansing, Mich, Chairman.

The joint committees were aided in their conference at Chicago by the following two persons, who concurred in the final report:

MARY E. SWEENEY, President, American Home Economics Association, East Lansing, Mich.

ALICE M. LOOMIS, State Supervisor of Home Economics, Lincoln, Neb.

Chicago, May 9, 10, 1921.

The following paper was presented by W. R. Perkins, Director of Extension of Louisiana:

#### EDUCATION FOR EXTENSION WORKERS

BY W. R. PERKINS

It is well to consider first the work that is to be done by an individual before we can attempt to intelligently map out a course of education that will best fit him for the duties that he is to perform. We all doubtless have a more or less clear conception of the broad field that must be covered by the county agent and know that he must have an intelligent understanding of every line of work that is touched by the farm family, in the field, in the home, and in the community.

The first suggestion, in regard to the preparation of the county agent, is that he should have been reared on a farm and that he should have taken part in the active operations on the farm by actually performing the labor connected with all phases of the work. A man reared out of touch with farming will feel, when he reaches manhood, that there are many things he can not acquire, and many of these are very important. Neither will a man reared in a city, without farm experience, be able to understand the conditions surrounding the farm and the people on the farm. He will not understand how they think nor will he know their attitude toward things in general.

The next step in the education is the preparation to enter the freshman class of a standard college, where he will take four years of study, and possibly a fifth year. One of the requirements should be that the prospective agent should have requisite units and enter college at 18 to 20 years of age, the latter being the preferable age. During these four years, I doubt if it would be wise to have in mind the idea of specialization in any line of work. Educate the man first by giving him a very thorough and hard course in the fundamental subjects that are recognized as constituting a good education. By the fundamental subjects in this particular course of study is meant the subjects on which are founded the theory and practice of agriculture and home economics and those that will better fit the county agent to be a leader and teacher in the work.

I would suggest about the following for the units required in the four years:

	Hours
English .....	6
Journalism .....	3
Public speaking and debating .....	3
Language .....	6
Mathematics .....	3

	Hours
History .....	1
Psychology and sociology .....	3
Economics .....	3
Commerce .....	3
Engineering .....	3
Chemistry .....	6
Botany and bacteriology .....	3
Geology .....	2

In addition to these 45 hours, the remainder of the time should be filled up with courses as follows:

	Hours
Agronomy .....	6
Animal husbandry .....	4
Dairying .....	4
Horticulture .....	3
Veterinary science .....	2
Marketing .....	1

This will not cover all of the vocational subjects that should be studied, nor will it give an opportunity for the practical work that should be given the student before he gets out in the field as a county agent. For that reason I would suggest, and I think it very important, that a fifth year be added to the course for those preparing for this important work.

During the fifth year additional work should be given in agronomy, covering the subject of soils and soil fertility problems very thoroughly, farm crops, and farm machinery. Animal husbandry courses in livestock judging and in herd management, in particular, should constitute important work. To get the proper viewpoint in regard to dairying, a considerable amount of time should be devoted to herds, with especial reference to care and treatment of the animals. Some additional work in horticulture, especially in trucking and orcharding, should be given. One of the important things that should be taken up in connection with all of these courses is marketing. The county agent should be familiar with the handling and getting of products into the big markets through cooperative effort on the part of the farmer. Some work in organization should also be given in this year. Another very important thing that should not be overlooked during the fifth year would be some further work in practical operations on the farm. It is supposed that every agricultural college has, or will have, an up-to-date farm where everything is done according to best methods and where only competent men will be in charge. The county agent, during this fifth year, and during the preceding years, should have become familiar with all practical field operations carried on there. In addition to this, a strong course in farm management should be given during the fifth year, not only in connection with the work of the college farm, but in the making of surveys and studying the methods followed by leading farmers throughout the territory within reach of the college.

Probably the weakest point in a county agent, aside from objectionable personality, is inability to awaken an interest in the minds of the farmers in improved methods and systems, or, in other words, a lack of ability to "put things over" with the farmer. I believe a course should be provided in this fifth year that will give the prospective agent all of

the suggestions possible as to how to do the work. It is frequently stated, as an objection to the fifth year, that young men can not afford to spare that much time. I doubt if such objection is a very serious one, for the reason that it is no uncommon thing to see men who have left college before they were fully trained keeping about the same position for years that they had when they first got out of school. The importance of the work that a county agent is called upon to do is so great that, in my opinion, too much education can not be given. When our people come to a realization of the benefits that may be derived from having a thoroughly trained, high-class county agent, home demonstration agent, and club agent, salaries will doubtless be sufficiently high to justify this extra preparation.

The statements in this paper have referred largely to the county agent and his work. The same principles, in a general way, should apply to home demonstration agents and club agents. The specialist, of course, should have special training and be master of his particular field of work. He should not only know the subject matter but he should determine how the work is to be done and should be held largely responsible for the activities of the agent along the particular line.

THURSDAY AFTERNOON, NOVEMBER 10, 1921

At this special session the following paper was presented by W. A. Lloyd, States Relations Service, United States Department of Agriculture:

#### METHODS OF BUILDING AN EXTENSION PROGRAM ADAPTED TO THE NEEDS OF LOCAL COMMUNITIES

BY W. A. LLOYD

Extension work is based on the assumption that there are certain worthwhile facts known to a comparatively few that could with profit be known by the many, and that those in possession of the facts possess the desire and the ability to impart the information in a manner that will be understood and accepted by the people to whose business and life it applies.

A program in agricultural extension work is simply an organized plan of presenting information. It has been done in the past by means of the agricultural press, popular bulletins, farmers' institutes, extension schools, short courses, agricultural trains, demonstration farms, and more recently, farm demonstrations. All of these methods presupposes a superior wisdom resident somewhere in an editorial office, in an agricultural college, in the Department of Agriculture, or elsewhere, that knows what is needed better than do those who are engaged in the occupation. This theory has been fundamental ever since the Pawtucket Indian, Squanto, conducted the first farm demonstration work on the American continent in 1621 by showing the Plymouth farmers how to fertilize their corn by placing fish under the hills. This premier county agent may have been an ignorant savage but he could qualify as a "corn expert" and the Plymouth community respected his "superior wisdom."

The Agricultural Extension Act of 1914 was based on this central thought as expressed in the words of Congressman Lever:

*"The theory of this bill is to extend this system of itinerant teaching, the State always to measure the relative importance of the different ideas*

*or activities to be pursued and to determine upon the most important to the entire country, by at least one trained demonstrator or itinerant teacher in each agricultural county, who, in the very nature of things, must give leadership and direction along the lines of rural activities, social, economic and financial. This teacher or agent will become the instrumentality through which colleges, stations, and the Department of Agriculture will speak to those for whom they were organized to serve with due respect to all lines of work engaged in by them."*

It needs no argument here to establish the wide difference between the possible results of established scientific facts applied to agriculture and of average agricultural practices, though it is perhaps no wider than between scientific railroading and railroads-as-they-are-run, or scientific mining and the present mining methods.

The chief difference between farm demonstration, or, as it has become commonly known, county agent work, and other and older forms of extension work is that it puts the teacher in intimate and constant contact with the person taught. Mr. Lever said in support of his bill:

"You can not make the farmer change his methods which have been sufficient to earn a livelihood for himself and his family for years, unless you show under his own vine and fig tree, as it were, that you have a system better than the system which he, himself, has been following. The plan proposed undertakes to do that by personal contact, not by writing to a man and saying that this is a better plan than he has, or by standing up and talking to him and telling him that it is a better plan, but going on to his own farm, under his own soil and climatic conditions and demonstrating there that you have a method which surpasses his in results."

The county agent lives in the county instead of at the college and the demonstrations are on the farm instead of at a State farm under more or less controlled condition. Whatever plan or program the early county agents had—I speak particularly for the work in the North and West—was the college plan which was already being projected into the county by various agencies already existing at the college. The first county agent in New York in 1911, got his plan or program from Professor Stone, who wrote him a letter when he took up his work, urging liming as fundamental and pasture improvement as the central idea to promote on the rolling farms of Broome County. In Illinois it was the lime-phosphate-manure-clover-livestock formula of Dr. Hopkins that furnished the creed of the county agents. In Iowa it was the spectacular seed corn work of Professor Holden, and in North Dakota the forage crop-livestock-something-besides-wheat formula of Professor Cooper, and so on in other States.

Not all county agents, however, were told whither to steer their barks; many, perhaps most of them, were left to sail an uncharted sea and were told, as I heard a State leader tell a county agent, when the young man who had just been appointed to a county asked what he was expected to do: "I do not know," said the leader, "we want you to go down there and find out." That reply may have been a confession of ignorance or an evidence of wisdom, or both. The county agents, both those with institutional plans and without, soon found that the county agent job was a very real one. There was all the difference in the world between making a speech telling what ought to be done, and getting the next train out of town and getting farmer Bill Brown to change his way of planting corn. The county agent found that the farmer's action for the most part was

governed, not by what he wanted to do, not even by what he knew he should do, but largely by what he must do. His work was to be measured, not so much by what was needed as by what was possible.

To illustrate: The soil might need liming; lack of lime might be the limiting factor in crop production. Geological strata might indicate it; soil tests might show it; demonstrations might prove it. Advocacy of liming might still be out of place in a county agent's program simply because lime was not to be had locally and the cost of freight and the long haul from the shipping point over rough roads to the farms made its use impracticable. The college might insist on the demonstration because the farms needed lime. Enterprising lime manufacturers might furnish the lime free for the demonstration. A beneficent railway management might transport it for this purpose without freight. A few farmers might donate their labor in applying it to a field and the limed clover might be tall and green and thick in comparison with that of the unlimed area. It might be called a successful demonstration and make good reading in a report, and still be utterly useless. There is no gainsaying that hundreds of such demonstrations have been conducted. You and I have seen them, perhaps lots of them.

The first impulse of the county agents, both those with the superimposed programs and those without, was to strongly individualize the work. In this personal service work he varied all the way from advising those who asked his advice to going out into the byways and hedges and hunting for someone who would give him a hearing.

In 1915 I read a paper before a conference of county agent leaders on the subject: "Shall a County Agent Have a Program?" That paper, as are the conclusions of this one, in part, was based on inquiries made of county agents, some 200 in the North at that time. Many of the county agents then frankly doubted if any program was possible, though their ideas of a program were little more than an itinerary or schedule. From the reports, however, we elaborated a plan of program making which served as a basis for demonstration work, and whose general conclusions are, we believe, still applicable, and are here quoted from a chart accompanying the paper, which is still being sent to county agents as appointed.

#### "SUGGESTED PROGRAM FOR COUNTY AGENT WORK"

##### *Preliminary Program:*

##### (1) An agricultural reconnaissance:

A general examination of the agriculture of the county as exhibited by topography, soil, climate, people, transportation, markets, crops, livestock and rural organization. This preliminary survey will be the principal work of the agent for the first three or four weeks.

##### (2) The improvement of the farm:

The establishment of a better farm practice through assistance rendered to farmers in connection with the improvement of:

- (a) The soil.
- (b) The crops.
- (c) The animals.

##### (3) The development of organization:

The inspiration of all existing, helpful rural organizations to perform their full duty to the community and the creation of such new organizations as may be needed.

**(4) An agricultural survey:**

A complete and orderly arrangement of all available data relating to the development and present conditions of the agriculture of the county. This survey will be carried on in connection with projects under 2 and 3. It may not be completed for one or more years. Upon the results of this survey, the agent will develop his permanent program.

**Permanent Program:****Primary problem:****(1) The improvement of the farm business:**

- (a) The profitable and productive management of the farm unit.
- (b) The coordination of farm practice as a part of a local or district system; standardization of production and products.
- (c) The economic purchase of supplies and the efficient distribution and profitable sale of products.

**Secondary problems:****(1) The improvement of home and community life:**

Direction of home and community forces to the end of developing a more wholesome, more advantageous and attractive life in the country.

- (a) Education.
- (b) Social life.
- (c) Recreation.
- (d) Home economics.

**(2) The federation of country organization:**

A complete orderly organization of country life"

The method of constructing this program was left to the individual initiative of the county agent, for the simple reason that no one had any suggestions based on experience to give him. In the early work the county was universally the territorial basis for the development of a program, and still is in several States. In this connection the returns from a recent questionnaire sent out show that of the 121 replies tabulated from extension directors, county agent leaders, county agents, and farmers, 17 percent favor the county as the territorial unit and 60 percent the community, the remainder favor the State, agricultural region, or township. It is interesting to note that 56 percent of the county agents favor the community, in comparison with 46 percent of the extension directors. The following table summarizes the replies from the various sources to the question: "Which is the best territorial unit for the development of a program of extension work: State; agricultural region; county; township; farm community?"

**SUMMARY OF REPLIES TO INQUIRY AS TO THE BEST TERRITORIAL UNIT FOR AN EXTENSION PROGRAM**

	Extension director	County agent leader	County agent	Farmers	Total
	Percent	Percent	Percent	Percent	Percent
State .....	25	16	0	6	10
Agricultural region....	4	12	6	6	8
County .....	25	16	14	16	17
Township .....	0	0	6	6	5
Farm community.....	46	56	74	66	60



Perhaps we should state here how the inquiry was organized. The questionnaire was sent to the 48 State extension directors, to 33 county agent leaders in the northern and western States, and to a cross-section of the county agents and farmers in the northern and western States. The county agents were drawn by lot by a clerk in the office, two from a State, and the farmers in the same way from a list of county chairmen. The county agents were drawn from a list of men all of whom had given two or more years of service. This it was thought should give a fair expression of opinion and experience from the standpoint of administrative and supervisory officers, of the county agents, and of cooperating farmers. One hundred and twenty-one out of a possible 202 replies were tabulated for study in the preparation of this paper, which were all that had arrived when the analysis was made. Ninety-five percent of the county agent leaders had replied, 83 percent of the county agents, 60 percent of the extension directors, and 27 percent of the farmers. It is believed those tabulated are sufficient to warrant some conclusions. The replies to these questionnaires afford a great wealth of interesting and valuable information which can not even be summarized adequately in a paper of this character.

Before taking up further consideration of the survey, it should be stated that, beginning about 1917, a few agents began to feel that the county was too large a unit for effective work, and the contact of farmers with the county program was too remote, and so there came to be developed what was called "community plans." About this time, also, there was elaborated by the county agent section in the Office of Extension Work in the Northern and Western States a county extension organization plan based on a community program with responsible farmer leaders in charge of each line of work, the chairman of these community projects making up county project committees on dairying, poultry, soil improvement, etc., as the case might be. The organization became thus self constituted, and hinged around work to be done, with only sufficient organization to do it. It had for its basis a common program of work in agriculture and home economics and involved the interest and participation of men, women, boys and girls with interlocking projects. The plan found wide acceptance. It has gradually become the basis for the county extension organization in more than 85 percent of the northern States and approximately 60 percent of the 1,200 counties. In other words, the community program with responsible leaders for a united piece of work found ready acceptance.

In working with county agent leaders and county agents in the organization of this work, there was gradually evolved some methods of program making or program technique which seemed to give uniformly good results. One of these came to be called the "source-of-income" method, or "a system of community analysis based on a discussion of chief sources of income." This was based on the idea that in any settled agricultural region the type of agriculture commonly followed is likely to be the one that is best adapted to that region. In new and developing regions the plan had manifest limitations, but was found even in Montana, Idaho, Oregon, and Washington, to result in sound, workable programs enlisting the interest and participation of farmers and their families. This method of program development is, I believe, commonly understood by extension workers in the northern States; there being considerable literature in regard to it issued by the Department of Agriculture and by the various

State colleges. The following is a brief description of this method of program making in a community that has not before developed a program:

(1) A small group of six or 10 men and women are invited to meet the county agent and home demonstration agent at the home of one of the group. The county agent who has previously studied the community states the purpose of the conference to be to study the community's needs and to see if some things can be determined which might be done to the advantage of the farm and home life of the community. He states that a satisfactory farm income is the basis of good farming and satisfactory living; and suggests that the discussion hinge about the various farm and home enterprises. He asks some such question as this: "What is the principal source of income in this community?" Someone may say, "well, we all milk cows here." It makes no difference what is mentioned, whether crops or livestock is mentioned first, the county agent keeping the minutes of the meeting and directing the discussion, follows up the lead and asks, "Well, is there anything the matter or are you all right in the dairying business?" The discussion follows freely with such questions as are needed to keep to the subject. It may develop that low milk production, scrub bulls, unsatisfactory price for milk are the difficulties. The county agent has noted these limiting factors or difficulties as they are brought out. He then asks: "What can we do about it?" "What about testing the cows and getting rid of the poor ones?" This leads to the possibility of a cow testing association, the county agent explaining what is necessary. In like manner the possibility of introducing some purebred bulls is discussed and the desirability of appointing a committee to meet the distributors or for the organization of a producers' association. So the county agent leads them over the ground, talking little himself, but drawing out a free expression of what the people think of the community and its needs.

Then the question is raised as to what the community will undertake to do during the next year. In other words, particularizing the program, making it definite, putting teeth into it. If the community is left with only a general realization of the need of better cows or purebred bulls and of studying the market milk situation, very little will have been done towards the advancement of the dairy interest of that community and very little or no action will result. The discussion should then turn to such questions as: Who would be a good man to canvass for the cow testing association? Who in the community could be interested in buying purebred bulls? Who ought to be on the committee to meet the milk distributors?

(2) So far it has been an informal conference of a few country people with the county agent. The next step is to get community approval of the plan. This is done at a meeting at a schoolhouse or public hall, the whole community being invited. The county agent has organized the discussion of the committee into a statement or chart under the headings of "sources of income"; "difficulties"; "remedies"; "work for this year" or "goal" and "leaders"; putting down only what was agreed to by the group conference. The purpose of the meeting is explained, the tentative program presented, and free discussion provoked. This meeting may add to or take away from what has been suggested by the committee, but the meeting is thoroughly worthwhile. The great advantage of the preliminary meeting is that it trains a few leaders to present the projects and to discuss

them. It greatly limits profitless talk and makes for an orderly and expeditious meeting. The meeting votes on the program, part by part, and elects leaders and makes definite promises as to what it will do, or establishes "goals" as it is coming commonly to be called.

It is agreed, for instance, to organize a cow testing association, to secure three purebred bulls, to cull five flocks of poultry, to conduct two canning demonstrations, and to organize a milk producers' association. The county agent tells what other communities are undertaking and encourages the development of community spirit. After the meeting the county agent and the home demonstration agent meet with the chosen leaders and arrange for demonstration meetings. Written plans are drawn up, reciting what the project leaders have to do; what the county agent, home demonstration, or club agent is to do; what help will be expected from the specialist of the college; etc. Thus the "what," "where," "when," "who" and "how much" of community program making is worked out. This sounds very simple as we have stated it here, and it would be so, if county agents and farm people were 100 percent perfect, but neither are, and so the resultant program is often an imperfect, illogical, and incomplete affair. It will vary all the way from a catalogue of minor troubles to a fairly satisfactory plan of work, dependent upon the human material that constructed it. We may be able to criticize such a program or even to make a program ourselves, without all this trouble, that will better fit the community's needs. It must be remembered, however, that the program is to be worked out by the community, that the people of the community are "just folks," that the program to be practicable must be what is possible rather than what is ideal.

Following the plan just outlined or modifications of it, the amount of demonstration work in the counties has been more than doubled, and the spread of influence—which is, after all, the acid test of extension work—has shown a marked increase.

The community programs are brought together, and in cooperation with a county committee of country people, are made into a county program. These county programs are considered by the extension division at the college and in turn may help make up a State program of extension work. After the first year, the community uses the program of the previous year as the basis of revision.

Below is given a summary of an analysis of progress made in carrying out the community programs of Vermont during the present year, the programs being definite, with specific promises made of things that were to be done. Assistant County Agent Leader Carrigan checked the spring time promise against the autumn accomplishment. In the first column is given a summary of the goals as shown by the programs submitted to the college by the county agents in the various counties. In the second column is shown a summary of progress made toward the accomplishment of these goals. Definite planning helps the county agent in checking up his own work and assists the supervisory officers in keeping in touch with progress. "C" in the columns below means county.

**STATE SUMMARY OF RESULTS OF THE COMMUNITY PROGRAMS IN VERMONT AS  
COMPARED WITH THE GOALS**

Analysis made September 1, 1921

	Planned	Accomplished
<b>Extension organization:</b>		
Community programs in charge of committees .....	137 in 11 c	107 in 11 c
Demand for home demonstration agents of boys' and girls' club leaders, or both crystallized .....	8 c	7 c
<b>Dairy or livestock improvement:</b>		
Cow testing associations to be organized..	3 in 3 c	3 in 5 c
Cow testing associations to be reorganized or improved .....	9 in 4 c	3 in 3 c
Registered sires to replace scrubs or grades	210 in 5 c	42 in 5 c
Bull associations to be organized or completed .....	6 in 3 c	2 in 2 c
Communities to make dairy stock survey..	5 in 1 c	1 in 1 c
Calf clubs to be organized .....	5 in 4 c	1 in 1 c
Communities to stage bovine tuberculosis clean-ups .....	2 in 1 c	3 in 1 c
Monthly ration services to be published....	13 c	13 c
Breeders' associations to be organized and cooperated with .....	4 c	3 c
Stock judging teams to be trained.....		3 in 1 c
Holstein tours to be conducted .....		1 in 1 c
Cream scoring contests to be conducted....		1 c
Poultry culling demonstrations .....	20 in 4 c	35 in 7 c
Poultry clubs to be organized .....		2 in 1 c
<b>Farm management:</b>		
Farmers' account books to be kept .....	885 in 11 c	741 in 13 c
Milk production cost accounts .....	207 in 10 c	97 in 11 c
Maple sugar production cost accounts to be kept .....	135 in 9 c	77 in 7 c
Potato production cost accounts.....	35 in 4 c	85 in 8 c
Farm management demonstration farms...	6 in 2 c	2 in 1 c
Farm account books to be summarized....		140 in 10 c
<b>Soils and crops:</b>		
Lime demonstrations .....	39 in 9 c	27 in 6 c
Fertilizer demonstrations .....	26 in 8 c	14 in 6 c
Corn variety tests .....	78 in 12 c	64 in 11 c
Oat variety tests.....	22 in 4 c	10 in 3 c
Legume demonstrations .....	21 in 4 c	3 in 2 c
Kale eradication demonstrations .....	29 in 5 c	8 in 6 c
Sod seeding demonstrations .....	2 in 1 c	1 in 1 c
Clover demonstrations .....	2 in 1 c	1 in 1 c
Sudan grass demonstrations.....	2 in 2 c	2 in 2 c
Sunflower demonstrations .....	3 in 2 c	2 in 2 c
Cooperative crop spraying groups.....	13 in 4 c	7 in 4 c
<b>Potato spraying demonstrations:</b>		
Acres certified seed potatoes .....	240 in 2 c	115 in 1 c
Other cooperators growing certified seed potatoes .....	60 in 2 c	107 in 7 c
Better seed corn cooperators (secured figures only in 5 counties).....		313 in 5 c
Farmers cooperating in use of lime (secured figures only in 4 counties).....		101 in 4 c
Fields on which data on corn varieties was secured .....		42 in 1 c
Fields on which data on oat varieties was secured .....		54 in 1 c
<b>Cooperative marketing:</b>		
Cooperative buying of farm supplies in...	7 c	6 c
Improve marketing conditions for certified seed potatoes in .....	5 c	
Establish cooperative milk plants or creameries in .....	4 c	3 in 2 c
Assist State-wide maple sugar marketing committee in .....	9 c	7 c
<b>Miscellaneous:</b>		
Local maple sugar association organized...		3 in 2 c
Home economics demonstrations arranged and promoted .....		64 in 4 c
Orchard pruning demonstrations .....		1 in 1 c

The above plan, very briefly sketched, was what I had in mind to present in more detail when first asked to prepare this paper; but desiring to get the voice of the people through representative expressions from the various forces involved, I sent out the inquiry before referred to. Time does not permit close analysis here that the returns fairly warrant, but briefly the following data has been helpful in reaching the suggestions with which we close the paper.

One of the questions asked was:

"Which reaches more accurate conclusions as to fundamental agricultural needs? (a) A study at the college by the extension service, including the county agents and extension specialists, of agricultural conditions and the application of such established facts as the teaching of agricultural research, experiment, and good farm practice may warrant, to their solution, through a series of State projects presented to representatives of farmers in the communities for their approval, or (b) An analysis of local 'troubles' by country people in small groups or at committee meetings of representative farmers and the application of the teaching of experiment and good farm practice to these 'self determined' problems."

This question was designed to get at the heart of the whole matter; that is, whether the program should be initiated from above, by the college, and formulated into State projects which would be sent out to the county agent to be submitted to the people for consideration, and their acceptance of those parts that they felt were needed, or to analyze local troubles with the people and arrange with the college for such help as was desired. The replies to this question are interesting. Of the extension directors 75 percent favored a program developed from the overhead, 25 percent from the community analysis; 43 percent of the county agent leaders favored a development from the overhead and 57 percent from the community, almost reversing the directors. Several qualified their answers, favoring a combination of the two methods. The county agents were 72 percent to 28 percent in favor of community development. The farmers, though too few to be of any great significance, were 8 to 7 for community development.

Another question asked was:

"Is an analysis of 'chief sources of income' a satisfactory basis for program development?"

The result as a whole here was 32 percent yes; 68 percent no. Ninety percent of the county agent leaders, 87 percent of the extension directors and 56 percent of the county agents raised objection to the method. Of the farmers 53 percent favored it. The vote from all angles raises some doubts as to the adequacy of this basis.

The chief objections are:

- (1) It is possible the entire system of farming may need changing.
- (2) Chief sources of income would omit profitable side lines.
- (3) It is not practicable in a single crop community.
- (4) It does not include the farm home.
- (5) There may be other more pressing problems of living.
- (6) Program should reach social as well as financial side.
- (7) Chief sources income may be inadequate from the standpoint of agricultural possibilities. For example, the chief sources in some communities may be dairying, when as a matter of fact the economic condi-

tion might be such that dairying should not be the chief source of income, but should be limited to a minor position. In one community the chief source of income had been early potatoes. Building a program on analysis of chief sources of income would have stressed the project relating to potatoes, when as a matter of fact that particular region should not have been growing potatoes, and the chief project should be eliminating that crop and securing others to take its place.

(8) Income starts a pessimistic line of thought at this time; like principal farm activities better.

(9) Would not include farm management, soil problems, and labor.

The objections are variously stated but fall for the most part under the above. Some are unquestionably well taken and others disappear in actual program making. For instance, in considering the difficulties in corn growing the soil problem will naturally come up if low yield is a difficulty. If single crop farming is the type prevailing the inadequacy of the income and the need of other sources is sure to be brought out, but it is not the purpose of this paper to defend the "sources of income" plan of program making as the best.

Still another question asked the chief difficulties in the way of intelligent program making. These appear to be:

(1) "Lack of intelligence on the part of farmers and county agents."

(2) Lack of local leadership.

(3) Country people do not see the need of a follow-up program. They are not used to working in an organized way.

(4) Over emphasis on unimportant and passing troubles and inability to see fundamental problems.

(5) Faction and strife in communities.

(6) Lack of training of the county agent in method of program making, farmer psychology, and common business methods.

(7) Lack of previous local survey.

(8) Tendency to lay too much stress on cooperative buying and selling.

(9) Inability to see over the fence. Failure to see the economic factor around the corner.

(10) (This from a farmer.) "Diffidence of farmers and difficulty in arousing them to actually do the necessary work themselves. The farmer is rushed to the limit in order to make little. He puts in long hours at physical labor and his mind is in no condition to do systematic thinking. Most of them have not had the necessary training for this work. The boys' and girls' work should develop future workers on farms with a better viewpoint toward farm life."

(11) Easy to make programs; hard to follow.

(12) Takes too much time.

(13) Lack of community spirit.

(14) Lack of follow-up work.

(15) Letting the county agent decide; lack of initiative.

(16) Getting local leaders to do their part.

(17) Biting off more than they can chew and overloading the program with impossible goals.

It would be interesting to take up these difficulties one by one and discuss how they have been overcome. After all, this is not so much the

THE RESPONSIBILITY OF THE EXTENSION SPECIALIST AND THE COUNTY AGENT  
IN DEVELOPING AND CARRYING OUT A PROJECT

BY PAUL V. MARIS

I find in referring to the records of previous meetings of this association that this subject was discussed under similar titles in 1916 and again in 1919. Many of the propositions set forth in these earlier presentations were fundamental in character and hold true today. We are now concerned, however, with the practices by which we should be governed in the light of more recent developments.

We have passed through the period when half or more of the counties in which the extension specialists worked were without county agents. During that period the specialist had two types of situation to meet. In the unorganized county he relied upon his own resources and personally established his own contacts. There was a tendency to carry these same methods of procedure over into the precincts of the county agent. The latter might find a specialist departing from his county after having attended a meeting held without the knowledge of the agent. Naturally, trouble ensued, but fortunately this situation is well in the past.

More recently new methods and practices have come into our work. Attention has been centered upon first one and then another of the following ideas. Without attempting to list them in the order of their appearance, several of the more important of these are:

(1) Stressing community programs of work, definite goals, and well chosen leaders.

(2) The development of county project committees which resulted in coordinating related activities, calendaring the main events of the project, and presumably increasing the enthusiasm of the members.

(3) The molding of several projects into the county-wide program of work.

(4) The conferences between county agents and extension specialists for the purpose of discussing ways and means of arriving at objectives, and agreeing upon dates.

(5) The emphasis more recently placed upon rather permanent state-wide programs of work.

(6) Placing greater responsibility upon the extension specialist, by holding him responsible for the effective organization of his project throughout the State, and asking him to concern himself, not alone with what he personally is to do, but also with what should be planned and done by others. He is no longer merely a man subject to call. He is the directing force. He organizes the situation in the State from the standpoint of his project.

Looking upon the above practices and ideas as the tools in the work shop of the modern extension organization handed down out of past experience, how are we now to apply them?

This brings us to a question, the answer to which will have a determining influence in the matter of procedure: Where does the project originate, at the college or in the community? There is perhaps a division of opinion upon this point. The pure self-determinationist would doubtless vote for the community as the point of origin, but this paper is based upon the conclusion that the research and investigational departments of our col-

leges and Federal Department of Agriculture are the beginning points. Our name implies that we are an extending agency.

It is our knowledge that experiment station results over a period of several years show conclusively that on the average a loss of a bushel of wheat per acre is sustained for each week that plowing dry-land summer fallow is delayed after April 1 that really and properly determines what the demonstrations are to be in a certain region of Oregon. It is impossible to develop a series of demonstrations to prove that point by asking a group of wheat ranchers, "What work shall we take up in connection with wheat?" They are likely to suggest a pool for the purchase of binder twine, in answer.

I have, however, witnessed the self-determination idea carried to even greater extremes. I have been present when a county agent would open an evening's discussion before a community group in something like these words: "What projects shall we take up in this community? I am at your service." It was the questioner and not the hearers who knew wherein the agriculture of the community was deficient, it was he and not they who had at his command instances of community cooperation in the solution of problems. It was, presumably, an exaggerated fear that he might unduly influence them to adopt something that wouldn't fit the situation that resulted in this unique abrogation of his plain duty and responsibility.

On the other hand the matter would be carried to an extreme in the other direction should the county agent, figuratively speaking, open his medicine case and exhibit a number of vials containing specifics for agricultural ills. For the dairy problems he promptly offers the cow-testing association, the bull association, and silo. To the poultryman he offers the culling demonstration and the poultry-house plans. To the potato grower he offers certification. To the housewife, the dress form, the fireless cooker, and a few measured calories as a substitute for an old-fashioned breakfast of fried potatoes, bacon, and gravy. Transgressions of this character are not common, if indeed they occur at all, but there is a danger of being too diadactic and approaching the problem in a rule-of-thumb manner.

The reasonable ground naturally lies between these extremes. We shall assume that the program of work originates at the college; is based upon experimental data or cumulative experience; that it is a long-time program; that it is modified to meet regional conditions; that the specialist carries it to the county and sells it by a method of proper analysis and discussion to the county agent and the appropriate county project committee; that the county agent carries it to the community and again by a proper method of discussion and analysis sells portions of it to the community. While it is not strictly self-determined, it is intelligently and voluntarily adopted. Other details of more or less local interest may be added to it, but the main timbers in the framework of the community program will fit into the larger structure of the State program and be a part of it.

Under this plan a State-wide campaign for the eradication of bovine tuberculosis may be organized, mixtures in grain varieties eliminated, harmful rodents and pests controlled, commodities organized for sale through a central agency, and many other things be done in the long category of achievements, with which we are all familiar.



## DEVELOPING THE PROJECT

Having traced the procedure in a general way, let us now enumerate the specific things for which the specialist is responsible and for which the agent is responsible in the development of a project:

We will begin with the specialist:

(1) His first duty is to know the experimental data bearing upon his project, primarily within his own State, and secondarily elsewhere. No one but the person discovering the fact should know it better than the specialist, and since his mind is not burdened with the thought of processes, methods, factors of error, etc., he should know fully as well as the experimenter the application of the fact to the phase of agriculture in question.

(2) The specialist should know the conditions surrounding his phase of agriculture or home economics in the State.

An illustration will show the importance of these two points. A farm crop specialist in the State of Oregon consulting experiment station records ascertains that the yield from the rotated plat is several percents in excess of that of the non-rotated plat. The farm management specialist has shown him how labor is eliminated and profits thus further increased by rotation. He meditates upon his observations in the State and the information he has secured from various sources. He knows that in some counties 25 percent and in others as high as 50 percent of the wheat lands in a general farming area are unrotated. He knows how yields have declined during the past 25 years. His further study fails to disclose any other single factor so closely related to increased profits and permanent agriculture as this, so he arrives at the conclusion that it should be given a major place on the demonstration program.

(3) He is ready now for the third step. Knowing how busy is each county agent, how many and varied are the demands upon him, how little opportunity he has had to pick up suggestions from a number of other counties, and how improbable it is, all things considered, that he will concentrate upon this proposition and work out a definite project concerning it, the specialist proceeds personally to perform that task. He figures out about how many demonstrations bearing upon the fact can be organized, about how many it would be reasonable for the agent to undertake, prepares some simple forms and blanks, calendars in a relative way the various steps in the procedure, and makes a list of what he is prepared to do specifically as a specialist. He then makes a circuit visiting agents in the territory affected, or meets them in a group and puts the proposition up to them. If he can visit the county, the project committee as well as the agent may have the benefit of the specialist's assistance. It may occur that the project committee will display a greater eagerness for the undertaking than the agent, who is perhaps a specialist in some other phase of agriculture and not greatly interested in it, or is afraid of overloading his program. Our actual experience has been, however, that the chief difficulty of the specialist, equipped with a definite and well worked out project, is to take care of all demands for his assistance.

(4) The fourth and last step of the specialist in developing a project is to make a book record, behind the proper county index, of just what a county adopts. Starting this record with the first meeting in the county,

he is able to build a chronological record of inestimable value in the later follow-up work and in the preparation of his own calendar of state-wide work.

The county agent then has the following duty in developing the project:

(1) He suggests slight modification in the general scheme to meet local conditions.

(2) He carries the proposition in his mind to the several communities of his counties and sees that general interest is aroused and that proper demonstrators are selected.

(3) He builds his project record on the proper page of his field notebook, under the community guide, just as the specialist does for the State so that he may ultimately include the various steps of procedure in his general calendar.

#### CARRYING OUT THE PROJECT

In the second or carrying-out phase of the project work, the same general division of duties is observed as in the development, the specialist cooperating upon a few lines over a wide territory and the agent directing many activities in a restricted territory. The specialist, therefore:

(1) Checks the progress being made and occasionally sends reminders to all agents, as certain steps in the progress are approached.

(2) He should be provided by the State leader with clippings from all agents' monthly reports containing information on his project.

(3) He should be present when possible at special features like demonstration tours.

(4) He should prepare an outline for annual summary of results and submit this through the county agent leader so that uniform and comparable data may be secured and state-wide summaries made.

(5) He should then receive clippings through the county agent leader from the annual reports of each county agent and prepare the annual summary of all work done under his project for the year. The responsibility of directing work under a given project in a State would seem to carry with it the responsibility of making the summary report. We have followed this practice and, while the assistant county leader did not rely wholly upon the summaries prepared by the specialists in preparing his annual report, it appears that with the better understanding now secured he may do so this year and have only the miscellaneous activities, not directed by specialists to summarize personally.

(6) Specialists should give publicity in a state-wide way to results secured.

The county's agent's duties in carrying out the project include:

(1) A definite understanding with each community project leader or demonstrator as to his duties.

(2) Follow up at proper intervals by letter, telephone call, or personal visits.

(3) Arrange meetings at the proper time to observe results.

(4) Make every possible effort to see that final results are secured.

(5) Compile summaries and give local publicity to points of interest.

## OBSTACLES TO PLANS

There are many disturbing influences which tend to prevent the machine-like operation of the plan outlined. These include such things as calls for assistance at community, county, and State fairs, and larger shows and expositions; calls for participation in general meetings and extension schools. It devolves upon the director and administrative staff to protect to the greatest extent consistent with its expediency the organized project work. Demands will be received that can not be ignored. Counties which are not conspicuous for any particular phase of agriculture may find themselves deprived almost wholly of specialist help because specialists are concentrating where their industry is more highly developed. Concessions must be made to these less highly developed counties in order that they may secure their proper share of help.

The difficulties of, or failure to carry out, this general procedure are usually due to lack of attention to important details. The county agent and specialist must become expert in calendar making. Our most effective specialists have dates booked far ahead. The execution of the work will undoubtedly be greatly facilitated by the drafting of definite projects. Those developed by the extension service of Kansas offer an illustration of a specific and definite project that is likely to mean something to those who sign it. This covers methods and procedures in the customary way and is followed by a definite outline of what each participating party is to do, as for example:

- (1) What the specialist will do.
- (2) What the county agent will do.
- (3) What the project leader will do.
- (4) What the local cooperator will do.

## SUMMARY

The more important features herein enumerated may be summarized as follows:

- (1) The project should be based upon well established facts.
- (2) The specialist should assume general responsibility for its execution throughout the State.
- (3) The county agent should give local supervision to the several projects constituting the program of work within the county.
- (4) The administrative staff should protect the organized work to the greatest extent consistent with expediency.
- (5) Careful attention should be given to important details of definite project writing and calendaring.

## RESOLUTIONS AND RECOMMENDATIONS

For action on various resolutions and recommendations originating in this subsection see page 353.

Adjourned.

## SECTION OF ENGINEERING

TUESDAY MORNING, NOVEMBER 8, 1921

The meeting was called to order by the chairman, Dean C. R. Richards of the College of Engineering, University of Illinois.

The following paper was presented by the chairman of the section:

### SOME OF THE PROBLEMS OF THE ENGINEERING COLLEGE EXECUTIVE

By C. R. RICHARDS

Formal instruction in engineering was first given in America in 1824 at the Rensselaer Polytechnic Institute. Later a number of colleges and universities gave some courses in applied mathematics, science, surveying, etc., which are of fundamental importance to the work of the engineer; but it was forty-one years after the opening of the Rensselaer Polytechnic Institute before the organization of the Massachusetts Institute of Technology focussed attention on the need for definite training of men for technical service. Agitation for the development of some system of general industrial education, especially in agriculture, was begun seventy-five or eighty years ago and various organizations of farmers passed resolutions regarding the need for better training for work in agriculture. The first definite plan for the establishment of a system of industrial education was proposed by Jonathan B. Turner of Illinois in 1862, when he urged that Congress make grants of land for the endowment of industrial colleges. It was not until ten years later, however, that Congress passed the Land-Grant College Act of 1862. We of Illinois are proud of the fact that this act, originally proposed by a citizen of the State, was made effective through the signature of another Illinoisian—Abraham Lincoln.

Without doubt, the organization of the land-grant colleges, more than any other single factor, was responsible for the development of our present system of industrial education in engineering and agriculture; and as a result, instruction in engineering and the applied sciences is now offered by a great number of technological institutes, and agricultural and mechanical colleges organized under the Land-Grant College Act, by State universities organized independently of this act, and by endowed colleges and universities. To a large extent the introduction of engineering work into the college curriculum has tended to revolutionize educational ideals, and to break down the ancient and conservative belief that anything in education which is useful can not have educational value. It is doubtful whether this traditional belief can ever be completely destroyed. It is based upon ideals which were developed when educational opportunities were limited to those persons who were preparing themselves for service in the church, in law, or in medicine and to those who through financial independence, sought an education for its own sake without regard to its applications to the affairs of life. Undoubtedly these educational traditions seriously interfered with the early development of technical education; and to a certain extent, their perpetuation has interfered with the progress of more modern and democratic ideals of education.

With the organization of the first land-grant colleges in the late sixty's and early seventy's it became necessary to build up faculties and to develop

plans for instruction and ideals which would govern the new education. It is small wonder, therefore, that in comparison with our present practice and experience the early curriculum and methods of instruction seem feeble and ineffective. In the brief period of fifty years there has been evolved a system of education whose value has been proved. A great number of men have been trained as teachers of technical subjects; the literature of engineering and applied science has been created; and there has been developed a clearer understanding of the general processes of education and particularly of these processes as applied in the training of men for service to their fellowmen. In view of the brief period which has elapsed since engineering education became general in this country, it is small wonder that there are still many perplexing problems concerning the best methods of instruction and the ideals which should govern its further development. The process of building up technical curriculums must be one of evolution, and it is probable that during the next fifty years there will be changes in methods and ideals as striking as are the changes which have taken place during the past fifty years.

Attention has already been directed to the spread of technical education and to the character of the institutions offering instruction in engineering. The character and effectiveness of instruction in technical science is, to a considerable extent, determined by the nature of the organization of the institution offering the work. In organizing institutes of technology the chief objective was to provide for the training of men for service in engineering and the related industries. The work of each department of these institutes is planned with special reference to the needs of students who are preparing themselves for such service. Even in the so-called non-technical subjects an effort is made in these institutes to show the application of such subjects to the work of the engineer; and it is probable, therefore, that subjects which ordinarily do not appeal to the average engineering student may be rendered more attractive and interesting to such students through the emphasis which is laid upon their practical applications and value. A similar condition exists in a majority of the distinctly agricultural and mechanical colleges whose work has been limited to instruction in the various branches of applied science and to general subjects which are regarded as essential thereto or a necessary part of the equipment of every well educated man. Where technical curriculums are offered in the university, however, it has been generally necessary, due to ancient ideals of university organization, that technical students take the same kind of non-technical work that is given to those students who have in mind no specific future career. Thus, instruction in English, literature, language, mathematics, chemistry, and physics is rarely designed to meet the specific needs of the prospective engineer, and in consequence, many of these subjects which are of the utmost importance in technical education are distasteful to the student who can not appreciate their value to the engineer and who desires to concentrate his attention on his technical studies. The imposition of these traditional conceptions of education upon the engineering curriculums in the larger universities has doubtless materially influenced the nature of engineering instruction in these institutions.

It always has been and it probably always will be difficult for professors in the liberal arts to appreciate or be sympathetic with the ideals

which should be maintained in the training of men for professional service. For this reason it is probable that technical education and professional ideals may be more effectively developed in schools designed for that purpose rather than in the larger universities. On the other hand, there is, of course, great danger that these technical schools, in the processes of educating men for technical service, may fail to give the breadth of training which should be regarded as essential in the development of every educated man. One of the chief advantages which comes to the student of engineering in a large university is his contact with fellow-students who are interested in every branch of human knowledge. Such contact broadens his horizon and gives him a better understanding of life and of knowledge.

In comparison with our present conception of the requirements for the training of engineers, the earlier work given in the technical colleges was largely vocational in its nature. Fifty years ago there was little understanding of the scientific problems underlying the technical industries. Men who were holding responsible positions in these industries had grown up with them without having received any formal instruction. These industries were unprepared to use the graduates of the technical schools effectively, and, as a consequence, they demanded that the product of these schools be men who could work with their hands at the beginning, for it was not recognized that the chief advantage of educational processes is to enable men to work with their heads. In view of these conditions the earlier engineering curriculums included extensive training in shop work, in mechanical drawing and surveying, and similar so-called practical subjects which were designed to fit men to adapt themselves quickly to the kind of duties normally assigned to young engineering graduates. Fortunately, with the rapid advance in the applications of science to the industries, the employers of graduates of technical schools are now more concerned in securing men who are competent to solve new problems; that is, to work with their heads rather than with their hands as draftsmen or as mechanics.

While there are some distinct disadvantages resulting from the organization of technical colleges in connection with our great universities, it is probable that the older educational ideals have tended to elevate engineering education and to reduce the emphasis upon strictly vocational training.

As I have observed the character of instruction in the different types of engineering schools in this country, I have felt that greater emphasis is given to vocational rather than to professional training in the distinctly agricultural and mechanical colleges than in the technical colleges of the larger universities.

The need for vocational training so largely recognized during the war, and the success of the various intensive training courses developed by the War Department to meet the needs of the time, have influenced many educators to believe that our educational system should be vocationalized to an extent which has not previously prevailed. While there is no question about the importance of vocational education and the need for a large increase in the number of trade schools, vocational training has no place in institutions of higher education, and I have felt, therefore, that we should endeavor to establish and maintain the highest professional ideals

for the training of engineers. The enthusiasm and hysteria of the war led many persons to predict the overthrow of our older educational processes and a substitution thereof of processes such as those which were evolved as a result of wartime needs. It seems to me that it speaks well for the sanity of our institutions of higher education that few of them have been greatly influenced by these wartime developments in education.

While I do not think that the better technical schools of the country will yield to the pressure for vocationalizing their curriculums, it is true that the constant extension of knowledge and the development of new specialties in engineering lead to a pressing and insistent demand for curriculums of a more technical nature; that is, for the exclusion of subjects which are non-technical but which are essential to the proper equipment of every well-educated individual. Each department of engineering is anxious to emphasize the importance of its own work, and it is easy to understand, therefore, why these departments are anxious to crowd into the curriculum more and more technical material and to exclude more general subjects. While, of course, the executive of these technical schools can not and should not dominate them, it is desirable that he stand steadfastly against all efforts to minimize the importance of the subjects which every educated man is assumed to know. If we continue to add specialized subjects to the engineering curriculums, it will soon become necessary to increase their length to five or even six years, or frankly admit that we are chiefly concerned with the production of artisans rather than well-educated professional men.

The growth of our large State-supported institutions during the past ten or fifteen years has been phenomenal and it has created many new and perplexing problems of administration. Most of our educational institutions have been organized along similar lines based upon traditional ideals which have been maintained in America almost from the beginning of higher education. A scheme of organization, satisfactory enough when an institution had but a few hundred students, has been continued, although the extent and variety of the work of these great educational institutions, the size of their faculties and the number of students have increased beyond anything considered possible when the scheme of university organization was introduced. Many of the State-supported institutions in the central west have student enrollments which are approaching the ten thousand mark. With the present rate of increase many of these institutions will soon have student enrollments in excess of ten thousand, and they may look forward to double that number within a relatively few years. I do not believe that these great institutions can continue to function effectively much longer without radical changes in their administrative organization and in the general plan of instruction. Undoubtedly, the effectiveness of the work of instruction, particularly of professional instruction, is greatly influenced by the nature of the organization. Some day some university president or board of trustees will have a vision of the opportunities and the responsibilities of these institutions which will lead to the development of some plan for their reorganization along lines which will insure a larger and fuller development of the various educational units, and which will so improve the administrative machinery as to reduce to a minimum the administrative processes and red tape which have grown up under our present scheme of organization.

No one of the duties of the engineering college executive is so important or so difficult as the development of the teaching and scientific staff. While good buildings and fine equipment are desirable for the best instruction in engineering, we will, of course, agree that no matter how complete or elaborate the physical plant may be, it is valueless without a corps of well-trained and experienced instructors having enthusiasm, vigor, and interest in their work and in their students. I have sometimes felt that the training of teachers of engineering is a function of the engineering college which is of equal importance with the training of students. Most engineering educators, even the most distinguished of them, began their teaching careers by accident rather than by design, and I have known few if any instances where men have gone to college with the avowed purpose of preparing themselves to teach technical science. In view of this condition it is remarkable that the teaching processes in our engineering schools are found to be so effective and generally satisfactory.

The criteria which influence our judgment in the selection of men for teaching positions in engineering are necessarily different in some respects from those which apply in other fields of learning. The successful teacher of engineering must have had a thorough training in the fundamentals of his profession; and he should have had such an amount of practical experience as to give him assurance in his knowledge of engineering science and its applications in practice, and to inspire the confidence of professional engineers and of his students.

For positions of large responsibility in our technical departments it is desirable to secure men whose training and experience are acceptable and who, through scientific activities or contributions to the literature of engineering, have attained recognition as authorities in their subjects. In addition the successful teacher must be a man of sufficient personal charm to win the enthusiastic approval of his students and their respect and affection. Most engineering teachers will be called upon to perform some kind of administrative duties, and it is desirable, if not essential, therefore, that they have the ability to discharge such duties effectively. Not the least important qualification of the successful teacher of engineering is his ability to cooperate with his associates without the development of friction and petty annoyances. The specifications for the selection of teachers of technical science are generally more exacting than those required in the selection of teachers of non-technical subjects, so the development of a suitable staff of instruction in the technical college is a most difficult process.

In the administration of engineering colleges in the large universities some additional difficulties in the selection of members of the staff are frequently encountered because of the impossibility of applying the same criteria in the selection of a professor of engineering that would be applied in the selection of a professor of Latin or Greek. In most of these large institutions the possession of a doctor's degree has come to be recognized as essential to the appointment of an individual to a position on the teaching staff above the rank of assistant. Unfortunately, perhaps, there are relatively few men engaged in the teaching of engineering who have earned their doctor's degree "in course," although there is an increasing number of them who have been awarded honorary degrees. Under normal circumstances, after the completion of the undergraduate curriculum, successful



practical experience is of more importance in the training of the teacher of engineering than is an equal amount of advanced graduate study without any practical experience. There is no question regarding the importance of advanced study and research in one's specialty, but as I have indicated, such study is less important than practical experience at the beginning of a young engineering instructor's career.

Many of us are interested in the advancement of graduate work in engineering, although we have been embarrassed at times in our efforts to assign the direction of graduate studies in a particular field to a member of our staff whom we considered to be particularly well qualified to handle the work, but whose lack of graduate degrees or of published books or monographs was regarded as sufficient reason for excluding him from such advanced instruction. It is exceedingly difficult for professors of "the humanities" who are often unfamiliar with the practical affairs of life, to realize how essential practical experience is in the training of the engineering teacher and that the work of the engineer demands a constant pursuit of science and the frequent preparation of reports or papers which are comparable with scientific papers, but which from their nature are not available for publication.

Again, in the selection of men who are assigned to the work of instruction in the college shop laboratories, it is difficult and in many instances impossible to find college graduates who are conversant with the shop processes and who are available at the salary rate which our educational institutions are prepared to offer. During my career as an engineering educator, I have been greatly embarrassed and exasperated in my efforts to overcome the prejudices which exist in the mind of the average university president against the employment of practical men for these positions, despite the fact that a penurious policy prevents the employment of educated men. In my own opinion, our lack of complete success in the utilization of the shops as effective engineering laboratories has resulted from the traditional prejudice and belief that the shop processes do not demand intellectual as well as manual skill.

In many of the American technical schools it has been the practice to grant a rather large measure of freedom to the members of the faculty who desire to engage in outside commercial practice. In some institutions the practice is encouraged because of the belief that a certain amount of contact with actual engineering work is essential to keep the professor abreast of the developments in engineering practice and science, and to furnish him experience and material which will inspire the respect and confidence of his students. In many institutions which have definite policies concerning the conduct of expert work, the professors are paid low salaries in the expectation that their fees for professional services, in addition to their salaries, will provide them with incomes which will meet their reasonable desires. You are all familiar with the arguments in favor of this practice. Some of these arguments are good; many of them are unsound. While a professor of engineering must have had practical experience, I do not believe that it is desirable or necessary to his success that he engage in commercial work during the academic year. No man can serve two masters, and it is doubtful whether many men can conduct a large consulting practice simultaneously with the discharge of regular teaching and other college duties, without neglecting one or the other obligation.

A consulting expert's relation to his clients may frequently be such that he will be forced to neglect his university duties to protect the interests of a client who is dependent upon him to carry to a prompt conclusion some important engineering commission. It is an easy matter for one to postpone a class in the expectation that he will later make up the time with his students which he has lost. It is not always easy to realize these expectations. It seems to me that in those institutions which permit the members of their staff to engage in outside activities for personal gain a spirit of competition will be developed between the members of the faculty, and in many instances, between the members of the faculty and consulting experts whose livelihood depends entirely upon their commercial activities. An institution, particularly a State-supported institution, may be very seriously embarrassed because of criticisms which will result from such competition. One of the chief objections raised by consulting engineers against the conduct of consulting practice by college professors is that the latter do not need to maintain offices and staffs of assistants, and that they may use freely many of the facilities of the university as well as their own students in the conduct of personal work.

In general, it is my belief that a college professor who desires to become recognized as an authority in the subject which he teaches will best serve his own interests as well as those of the university with which he is connected and the profession if he devotes his spare time to the conduct of scientific research or to the preparation of books or articles which are real contributions to the literature of the subject he represents rather than by the performance of routine consulting work. Not infrequently such men may properly undertake for pay the solution of some important scientific problem which is of immediate importance to a particular industry, for from the nature of their training and experience they may be better prepared to undertake such work than the average practitioner.

Abuse of the privilege of engaging in expert work would be overcome if our educational institutions should demand that all fees received in payment for such work be paid to the institution. If the incentive of personal gain were taken away, few professors would be interested in carrying on outside activities except in cases where their professional standing and experience would be greatly enhanced by the work. Naturally, the salaries paid to men of outstanding ability would need to be advanced if there were no opportunities for enlarging their incomes through commercial work. Everything considered, I am convinced that the interests of our students and of our institutions will be advanced if we definitely restrict the outside activities of our teaching staff.

The "labor turnover" in our colleges, to adapt from the industries a commonly used phrase represents a real economic waste and a serious loss of efficiency in the work of an institution. Many young men and not a few older ones shift from one institution to another without, in many instances, a sufficient increase in salary or of opportunities to justify a change. Each institution, in seeking to fill its quota of instructors, naturally desires to secure men who have had teaching experience, in addition to other experience and training considered essential for a successful teacher, and the only manner in which this desire can be realized is by raiding the preserves of other institutions. So long as there is a shortage of teachers of technical subjects, as has been the case during the past few

years, this process will, of course, continue, however detrimental it is to the advancement of technical education. Some institutions will need to take untrained men and give them training and experience as teachers, in the expectation that other institutions will profit by their efforts. While I realize that one of the most important functions of every institution of higher education is the training of teachers, yet after all the process which I have described is, in many respects, an unfortunate one, except in so far as it provides for real academic and financial advancement. No institution can hope to provide salary funds sufficient to enable it to advance every worthy assistant or instructor to a professorship, and hence when a man's experience and attainments entitled him to more rapid promotion than the institution with which he is connected can offer him, he must seek employment elsewhere. However, the fact remains that the process is one which reduces the efficiency of our educational processes. It has always seemed to me to be particularly unfortunate that the older faculty men must devote so large a portion of their time to breaking in young and inexperienced teachers, thus reducing their effectiveness in productive scholarship.

In the process of recruiting the teaching staff there is danger that we may impair the sense of responsibility and loyalty in the minds of our younger men. Frequently after having definitely accepted an appointment or a reappointment, and in many instances almost at the opening of a new academic year, members of the faculty resign and accept appointment elsewhere under conditions which do not represent large advances in salary or opportunities. Personally, I should be very glad if the engineering colleges of the country would agree to stop this practice of "passing the buck." It would be a fine thing if we could all agree that the open season for college instructors would close on August 1, and that it would be considered a breach of courtesy for one institution to go gunning after an instructor in another institution after that date. I do not pretend to be free from this practice which I so greatly deprecate; but during recent years I have been very reluctant to agree to the appointment of a man who is willing to break his contract with another institution at a time when that institution will have great difficulty in filling his place.

In many cases, we are responsible for the failure of our younger men to realize the importance of carrying out a contract. To a considerable extent I think the institutions themselves are to blame, for under normal circumstances appointments to academic positions are made in such an informal fashion that the individual appointed does not fully realize that in accepting appointment to do a particular piece of work over a definite period of time, he has entered into a contract which should be as sacred to him as any other business obligation. In my judgment, the official notification of an appointment to a position in the college faculty should be in the form of a definite contract which will recite fully the responsibilities of the institution towards the individual and the responsibilities of the individual towards the institution. I should be glad if we could devise some means of imposing a money penalty upon a member of the faculty who, after a certain date, resigns his position, to be effective before his successor has been found.

Without doubt the human relation between the college executive and the members of his staff presents the most interesting and at the same

time many of the most perplexing and difficult problems with which he has to deal. The fact that no institution of learning can be conducted on a basis strictly comparable with that of a business organization, renders some of our problems more difficult and their handling more painful. At the time he was President of Columbia University, Dr. Seth Lowe is reputed to have characterized a college president as "one who gives and receives pain." I have often felt that this characterization applies to the college dean with equal if not greater force, for he is, by the very nature of our organization, a buffer between the faculty on the one hand and the president or board of trustees on the other, charged with large responsibilities, but with little actual authority.

In many of the larger technical institutions the deans are no longer able to give much attention to routine details connected with the administration of student affairs. Such institutions have been organized with assistant deans, or assistants to the dean, who are charged with the responsibility of administering the regulations of the institution in its relation with undergraduate students. I greatly regret that I no longer have much opportunity to come into direct association with the students in my college, but unfortunately the administrative details to which I must give attention demand so large a proportion of my time that I must delegate authority for the administration of student affairs to my assistant. This is one of the inevitable results of growth. I have greatly feared that with the continued growth of these large institutions we shall develop such machine-like processes in the administration of student affairs and in the instruction of students that they will take on many of the characteristics of a modern manufacturing plant, to the detriment of both faculty and students. We can not turn out students as we manufacture automobiles, and any effort to standardize our methods to too great an extent will, in a large measure, defeat the purposes for which our educational institutions were organized. We can not standardize human beings, nor is it possible to standardize completely our relationship with them.

It has been my belief that a college executive should make every effort to assist his associates in their efforts to render more effective service. He must, therefore, give much of his time to the development of plans for the enlargement and improvement of the material facilities of instruction as well as to the development of a strong personnel. However important the latter may be, it is, of course, essential that proper facilities in buildings and equipment be provided to secure efficiency of instruction and to keep members of the faculty contented. If a particular college attains a well-founded development, it is always evidence to me that the executive of the college has been possessed of vision and judgment, for an all-around development of the college is unlikely to occur if the responsibility therefor is left entirely to the individual departments. Those departments which are in charge of vigorous, aggressive leaders may be expected to secure an undue proportion of funds available for extension and for maintenance, unless the dean sees to it that every department has adequate and proper support.

In the administration of funds for maintenance and general expenses the methods vary with different institutions. It has always seemed to me that greater efficiency and economy of administration may be secured, when the appropriation to the individual college is made as a lump sum

to be expended under the direction of the college executive. It has been my custom, for instance, to make an initial allotment of funds to each department, sufficient to meet the ordinary expenses of instruction and to purchase essential minor items of equipment, retaining in my own hands a considerable contingent fund to enable me to meet emergencies promptly. In the event that no such emergencies arise, the contingent fund may be expended for equipment or to supplement the initial allotments to the departments in case of necessity. In all of his relationships with his department heads, the dean must, of course, repose confidence in them. They must be responsible for departmental expenditures, and they should be encouraged to give careful attention to the financial administration of their departments so that maximum returns may be secured for each dollar expended. Unfortunately, all department heads are not equally good administrative officers and many of them are exceedingly careless in the expenditure of funds. One of the unpleasant tasks of a chief executive is to prevent extravagance and carelessness in the administration of department funds.

As I have already intimated, it seems to me that the educational institutions of the country should discourage the performance of more or less routine expert work for pay, and that they should encourage every member of the teaching staff to devote a portion of his time to scientific research or to the preparation of technical treatises. No institution can hope to attain a position of eminence unless it is contributing something to knowledge. It has seemed to me that the college executive must do everything possible to stimulate the spirit of research in his associates and to aid them in such work by the assignment of funds or special assistants, or by the reduction of teaching schedules so that a reasonable amount of time will be available to every man capable of effectively utilizing it.

This association has done much to promote interest in the development of a system of engineering experiment stations. It must recognize, however, that research done in such organizations involves the expenditure of much time and money. Members of the teaching staff who are obliged to carry heavy schedules of routine teaching and administrative work can not be expected to respond to a stimulus for the performance of scientific work, and if they do make the attempt, it will be at the expense of other activities. If a man is capable of doing valuable scientific work, he should not be expected to carry a teaching schedule which, if it be efficiently handled, will demand all of his time.

I have endeavored to present some of the problems connected with the administration of colleges of engineering which have presented themselves to me, in the hope that the discussion of these problems may elicit information concerning the methods of solving them which have been devised in different institutions. Some of the more perplexing problems are, however, inherent in the form of organization of an institution, so that the method of solving a particular problem at one institution may not apply equally well at others.

#### DISCUSSION OF DEAN RICHARDS' PAPER

D. S. KIMBALL, Cornell University. I have read Dean Richards' paper with great interest and profit, and find myself in very close agreement with his ideas as to the administration of engineering colleges. As

he has pointed out, it is at the best a somewhat difficult and often a thankless task.

He has brought forward one problem which technical schools must face in the near future, namely, their relation to the so-called colleges of arts and sciences. In practically all of our technical colleges today, instruction in the non-technical subjects and in a considerable number of the fundamentals of engineering are given by departments in the college of arts. The result, as he has stated, is that quite frequently the instruction so given does not have the bearing upon engineering that it should, and, in the case of non-technical subjects, often fails to awaken the interest of the young engineer. At Cornell an effort has been made to solve this problem by asking the departments in the college of arts that give instruction to the engineering students, to set aside a portion of the instructing staff for the special purpose of instructing engineering students. In mathematics this is easily done, and we have a similar arrangement for economics and for English. This has the very decided advantage of keeping the teacher of non-engineering subjects in touch with his fellow teachers in his line of work, and at the same time gives him an opportunity to get the viewpoint of the engineering student toward these non-engineering subjects, which has proven so difficult often to the young engineer.

I agree with him heartily as to the importance of engineering schools insisting on rigid training in the fundamentals of engineering. In these days when every engineering college is beset by requests and demands for all kinds of modifications of its curriculum, it is well for us all to keep in mind that any weakening of the fundamental instruction will result in the production of an inferior type of engineer. If it is possible to train engineers without teaching them engineering subjects, and without giving them the rigid drill that produces an engineering mind, then it should be possible to produce lawyers without teaching them the fundamentals of law, and to produce doctors without having them study medicine.

Dean Richards has brought out very clearly the disadvantage that all educational administrators must feel in the loss of contact with the student body through teaching. In all universities there will be found many able teachers who have been transformed into executives to the great loss of the teaching profession. One of the greatest teachers of philosophy and one of the finest Greek scholars that this country has seen was lost to the profession by making him a university president. He made a great university president, but it is an open question if his contribution to civilization would not have been greater had he remained a teacher. I believe that every administrator should, if possible, do some teaching, be it ever so little. Unless he does some teaching he is very likely to lose the viewpoint of the student, and the viewpoint of the teacher, and his efficiency as an administrator will be thereby weakened.

If I were to undertake to add anything to Dean Richards' discussion, it would be to accent a little more fully the point that the administrator in charge of any educational institution should be an educational guide and pilot, so to speak, for his faculty. Every administrator of this kind has exceptional opportunities, as compared to his colleagues, to travel, to attend meetings of educational bodies, to discuss educational questions, and to evaluate the trend of educational thought. He will be remiss in his duties if he does not take back to his faculty any suggestions and new

thoughts that may come to him. It is not necessary for him to decide as to the usefulness of these suggestions; that should be the function of the faculty. A good administrator can do a great deal to stimulate the interest of his faculty in educational matters by thus laying before them the suggestions that come to him through his relations with the outside world.

ANSON MARSTON, Iowa State College. Dean Richards says, "If we continue to add specialized subjects to the engineering curriculums, it will become necessary to increase their length to five or even six years," and many other engineering educators besides Dean Richards are coming to believe that six years' college training are just as essential for engineers as for doctors and lawyers. However, numerous failures have demonstrated the inability of the single engineering college, however strong, to succeed in requiring six years' college work for engineering degrees.

Why can we not proceed in this section to secure concerted action by a sufficient number of strong engineering schools to inaugurate this great professional advance in engineering with certainty of success?

I am willing to say that I will agree at any time to recommend that the Iowa State College join with the universities of Ohio, Purdue, Michigan, Illinois, Wisconsin, Minnesota, Nebraska, Iowa, Kansas, Missouri, Washington, and the Kansas State College in concerted action requiring six-year engineering courses for all engineering bachelor degrees.

Dean Richards speaks of the qualifications of engineering faculty members. I believe that we should give our engineering staffs to understand clearly that both continued tenure of position and promotion in position must depend on active and definite programs of personal professional improvement—in graduate work, in professional experience, in membership and activity in engineering societies. The qualifications—specifications, if you please—for professors, associate professors, assistant professors, and instructors should be formulated definitely and stated publicly, and should recognize graduate and professional degrees. Promotion should be on merit only, and not merely because of length of service. Uniformity in salaries should obtain only between certain maxima and minima for each grade, and we should not hesitate to pay an outstanding man a great deal more than the average man of the same professorial rank.

However, I can not agree with Dean Richards' apparent belief that all or nearly all the members of engineering faculties ought to engage in research. Worthwhile research requires men who are specially qualified for research—I may say inspired—and the average engineering professor had much better engage in other professional activities to accomplish professional improvement.

I believe that we should pay the members of our engineering staffs good salaries for full-time service, and that engineering deans and department heads should require full-time service from faculty members in return. By full-time I mean about 50 to 54 hours actual work a week, according to definite schedules laid out to include class work, class preparation, marking exercises, office work, committee work, research work, and all other work directly for the college.

Department expenses other than salaries, including stenographers' pay, eventually subtract from professors' pay, and such expenses should be cut

to the minimum. The general rule should be local option as to typewriter machines but prohibition as to typewriter girls.

The matter of traveling expenses is troublesome, and their total becomes so staggering in a large institution which is liberal in this particular as to endanger serious cuts in appropriations because of the criticism of taxpayers. I believe that the college ought to pay only the actual, necessary traveling expenses incurred by employees who are sent on trips on purely college business. Any additional sums available for traveling expenses can be used to best advantage to increase the salaries of those professors who attend professional meetings at their own expense.

Dean Richards says, "I greatly regret that I no longer have much opportunity to come into direct association with the students in my college, but, unfortunately, the administrative details to which I must give attention demand so large a proportion of my time that I must delegate authority for the administration of student affairs to my assistant." With all due respect to Dean Richards, I believe that engineering deans ought to do the exact opposite. Personal association of the dean with students and faculty should never be delegated to any assistant. Moreover, the dean should teach some classes. On the other hand, business details and the machinery of collecting data of students' records can, and in a large school should be delegated to an assistant, along with all other routine and clerical work. This is a matter of organization.

All department heads should be required to teach classes as well as the dean—and to a greater extent. The students have a right to personal instruction in classes from the very best and highest grade engineers in the college. Department heads who do not teach are expensive luxuries. Moreover, the student sections should be so small as to insure real personal contact between teacher and students throughout the entire course. After all, no organization, no equipment, no wide reputation can take the place in engineering education of the personal inspiration of students by great engineer teachers.

F. E. TURNHAUSE, University of Wisconsin. The paper of Dean Richards reviews in a general way most of the problems confronting the administrative officer of the engineering school and gives some very instructive suggestions concerning many of them. The writer will undertake to discuss but one of these problems, that is, the development of good teachers.

Like most problems relating to education, success in teaching is very difficult to measure, and probably no two of us would agree on the best method of rating or exactly what basis should be used in determining the questions of salary and promotion. The general problem of securing good teaching is to be reported upon by a special committee on that subject, but it is proper to discuss the matter here as it relates especially to administration.

When our engineering colleges were small, with a student membership of only 150 to 200, the administrative problem hardly existed, at least in the form it now presents in our large schools, with an attendance of 1,000 or more. Formerly the dean, if there was one, probably met and became more or less acquainted with all the students, besides doing a considerable amount of teaching and conducting his own department. There were but one or two teachers in each department, all well known to the dean and



most of them of professional rank. Students were taught mostly by "professors," and the merits and demerits of all the teaching staff were pretty thoroughly known and discussed by all the students. When the old graduate came back he called around on the faculty and found most of his old instructors still on the job, and the various departments were sharply personified by the old teacher. As time went on the numbers of students and teachers increased and the returning old graduate still finds some of his old teachers on the job, but they are now heads of departments, with five to ten or fifteen other teachers of lower rank in the same department, most of whom seem very young and inexperienced to the old alumnus who got his instruction from the heads of the departments. His son is being taught by youngsters and never meets the head. The complaint is perhaps made that in the large classes of today the students can not come into contact with the professors as they were able to do twenty to thirty years ago. There is, undoubtedly, much truth in this assertion, but it is not so significant as it appears. In a conversation on that point recently I made the statement that the average age and experience of the teachers now giving instruction in technical subjects is greater than it was when the old graduate himself was in college. Facts and figures convinced the old graduate that I was right and he admitted that both he and I were getting old.

Nevertheless there is doubtless an element of real significance in the above mentioned complaint, but not exactly for the reason given. While the formal teaching may be as good or better than before, it is undoubtedly more difficult to develop the same desirable relation of student and teacher under present conditions than when the numbers were much smaller. The organization necessary in large schools tends to obscure the individual, and to secure the benefits of good organization and at the same time to develop the individual instructor is a very important administrative problem. In our efforts to improve the work of the student and to make each department just as good as every other and to see to it that a credit hour in each department requires just the same amount of time we are liable to over-standardize our instruction and our instructors. Undoubtedly the beginner is helped very much by the machinery of the department and a certain amount of guidance and setting of standards is advantageous, but I believe we are apt to carry this too far, to the detriment of both student and instructor. In this matter I think the thing to be kept in mind by the administration is to place responsibility upon the instructor just as rapidly and as far as possible, in regard to both administration and teaching.

In a large and stable faculty the group of older men are very likely to retain administrative details in their own hands altogether more than necessary. Perhaps they can do it better than the younger men, but are they not somewhat like the old graduate in that they forget they are getting old and that there are probably many of the younger men who can take responsibilities quite as well as they themselves fifteen to twenty years ago? More responsibility on the younger men is a good thing for them, while at the same time it relieves the older men of those administrative details about which they are apt to complain but which they are not always willing to drop. Of still greater importance is it to have the in-

structor take his full responsibility in his work of teaching. This work can not be done by centralized machinery. The real work of the school is done at the point of contact between student and instructor. The instructor is the cutting edge and every effort should be made to get him to realize that he is the man to do the job, and not the head of the department or the central office. If a student is doing poorly he should not content himself with sending in a card marked poor; if a student is absent he should know about the matter and not rely upon an excuse card issued by a dean who can know little or nothing about the case. It is too easy for the young man to shift his responsibilities to older shoulders and to continue for many years to look upon himself as a mere kid—a small cog in the machine; and we certainly encourage him in this attitude.

Summed up in a word, it is decentralization rather than centralization that I believe to be the correct administrative policy and one that can profitably be carried much farther than we are apt to think.

G. W. BISSELL, Michigan Agricultural College. Following a suggestion in Dean Richards' paper, I will outline some personal experiences as dean of engineering at Michigan Agricultural College.

The division of engineering consists of the departments of civil engineering, drawing and design, electrical engineering, and mechanical engineering. The degree courses in engineering are civil, electrical, and mechanical engineering and engineering chemistry. The professor of engineering chemistry is attached to the department of chemistry which belongs to the division of science, directed by a dean of science. This situation has not yet created a problem but might easily do so. Perhaps maintaining the *status quo* is a problem.

The deans of agriculture, engineering, home economics, veterinary medicine, and of women, the college financial secretary, and the registrar, together with the president constitute an administrative board charged with duties by trustees, president, faculty, or self-assumed. This board functions variously as a committee on policy, in matters large and small, on budget, as a shelter for president, faculty, and others from personal or direct responsibility, as well as an administrative body. The dean of agriculture and engineering are *ex-officio* members of the board in control of athletics. Thus the deans have institutional as well as divisional problems.

As dean of engineering in the Michigan Agricultural College one of my problems or tasks is to explain the connection between the name and the engineering activities of the institution to visitors, correspondents, prospective and actual students, and to law-makers and the agricultural friends and supporters of the college, and sometimes to justify our right to exist in the same State with a larger engineering college at the State university—the argument against the situation being based on the idea of needless duplication. Another is to listen to and placate those of our engineering alumni and former students who drift to distant parts seeking positions, with the diploma of an agricultural college, in name. I receive same rabid letters on this subject.

Problems of different character confront me based upon the following situations:

(1) The division of engineering is not self-centered. It furnishes instruction in drawing, surveying, and shop-work to students of other divisions.

(2) The division is not autonomous in its instruction work. Mathematics, languages, chemistry, physics, economics, etc., are taught by departments of other divisions.

(3) Engineering chemistry is connected, as above outlined, in a loose bond to the other engineering work of the college.

I have been a dean under the administrations of two presidents and two acting presidents. One of these four has said to me, "You understand your job, go to it." Another has forgotten at times that deans have feelings and prerogatives. Another has followed the happy medium, which I prefer.

Years ago a dean was concerned chiefly with the interests of the students. Today a dean is thought of as the executive of an organization. With an engineering school of about 500 students in a college of 1,700 students, I am able, or at least try, to combine the old and the new. I am adviser to freshmen and senior engineers and do a little teaching in each group and am responsible for the organization's effectiveness. Personally I regret the lack of contact with students which the teacher has who is not encumbered with executive or administrative duties and the lack of time for productive study along professional lines.

I have sometimes thought that a dean of engineering should be a man naturally an executive rather than naturally a teacher, a student, and an engineer, and that the salary accent is wrongly placed. But in the few cases that I know of where practical engineers without teaching background or business men have been drafted into deanships, or professorships, the result has not been happy and I am forced to admit that some good engineering teachers must be sacrificed on the altar of deanship.

Dean Richards has stated the situation very well and if his paper conveys the impression that deans have their vexations, we might remember the remark of David Harum anent the dog and his fleas and console ourselves that a dog is on the whole a reasonably happy and useful being—if well fed and disciplined and patted on the head occasionally.

A. A. POTTER, Purdue University. Dean Richards in his excellent address has brought to our attention the problems which are common to all deans of engineering.

The main function of the college executive is to provide proper facilities so that every student is developed to the limits of his ability and for the greatest usefulness to society. There is at present a marked agreement among engineering educators that the best type of instruction is that which is thorough and which prepares the individual for the largest development and greatest usefulness in the long run. The object of engineering education is not to develop well informed technicians, but men who can think clearly and correctly and who will become creative and responsible leaders of industry and of public affairs.

I fully agree with Dean Richards that vocational training has no place in an engineering curriculum. I am convinced, however, that the engineering student should be introduced early in his course to concrete engineering problems, in the solution of which he learns the use of mathematics

and science. These engineering problems should not be of the vocational type, but should deal with actual situations which require analysis and judgment. The freshman problems used by Iowa State College and by Purdue University may prove of interest to others.

Concerning specialization, I should like to see our engineering colleges strive to a vertical rather than to a horizontal growth. Are we not trying to include too many curricula in our engineering colleges? I believe that better results would be produced if we would limit our energies to fewer engineering curricula. There seems to be very little reason for teaching in every engineering college chemical engineering, mining engineering, architecture, architectural engineering and similar special courses. I would like to see more of our colleges limit their attention either to a curriculum in general engineering or to two curricula, one in civil engineering and the other in dynamic engineering.

Practically all engineering colleges are now suffering from overcrowded curricula, which defeat the best intentions of high-grade teachers and give the student no opportunity for reflection. Much could be eliminated to advantage from any curriculum if college professors would be willing to change their attitude about departmental autonomy, their desire to multiply the number of subjects taught in their particular department and their ambition to increase the number of teachers on their staff. If teachers are interested in the greatest development of each student in the least amount of time, they should be willing to forget traditional ideas concerning the weight of courses and to carefully scrutinize the credits of each course.

Among the most important of our functions is the development of our teaching staff. This requires policies of recognition and promotion which are based only on merit. The blanket seniority rule, which is one of the most deadening influences to initiative and creative effort, has no more place in an engineering college than it has in industry. It is also a mistake to make an executive position the goal of every teacher. An excellent teacher may not be the proper man to be placed at the head of a department and should realize that all people do not have to climb the same ladder to success. The teacher, the research worker and the executive all have important work to perform and each should realize that his success lies in the performance of duties which he can do best.

The question of outside consulting work and commercial testing seems to be among the most delicate and difficult problems of the engineering college executive. I am convinced that a person can not do much outside work during the academic year without neglecting his college duties. It is very difficult for two or three institutions to restrict such activities at the present time when the majority of our State and private engineering colleges believe in a large measure of freedom with reference to such matters. Personally, I feel that routine consulting work should be prohibited during the academic year, and that all outside activities should be carefully supervised.

I would like to see the engineering executives of all land-grant institutions agree that the "open season" for college teachers should close not on August 1 but on June 1. The practice of hiring away "stars" from other institutions during the summer should be stopped as it is unprofessional and unfair. At Purdue University the following form of contract

is required by every member of our staff and we consider it a sacred business obligation:

PURDUE UNIVERSITY

THIS MEMORANDUM is to the effect that.....  
has been appointed.....in Purdue University.  
This appointment is to be in force from.....to.....  
under the following conditions:

1. Compensation is fixed at.....annually, payable in.....  
equal monthly installments at the completion of each month's service. If  
for any reason, service ceases before the term of appointment is ended,  
payment shall be at the above rate for the time of actual service and no  
allowance shall be made for the uncompleted term of employment.

2. Except where appointment is for a specific limited term, it shall  
continue from year to year without further notice. Such appointment may  
be terminated by the University for causes relating to the conduct or the  
efficiency of the appointee or because of the discontinuance of the depart-  
ment or work to which the appointment is related. It may be terminated  
by the appointee by resignation, but it is expressly agreed that service  
under this appointment may not be resigned after July 1st for the suc-  
ceeding academic year without permission of and upon conditions approved  
by the President of the University.

3. Members of the Corps of Instruction are entitled to vacation dur-  
ing the summer months when the University is not in session, but in ex-  
ceptional cases their services may be required in connection with the needs  
of their departments during any or all of the period without extra com-  
pensation. Members of the Station and Extension Staffs are entitled to  
thirty days annual vacation after one year's service at a time to be mutually  
agreed upon, but such vacation may not be claimed at the expiration of  
connection with the institution.

The above stated conditions are hereby accepted and agreed to.

Signed

Signed

.....

For Purdue University.

Date.....

In connection with Dean Richards' paper, I should like to receive  
suggestions concerning the following problems from the engineering ex-  
ecutives of the land-grant colleges:

(1) What means should be used to discover and to train the excep-  
tional students? Is it fair to the exceptional student if he is allowed to  
carry the same curriculum and to solve the same problems which are re-  
quired of the average students?

(2) To what extent should graduate study in engineering be developed  
and will the industries be willing to recognize and to properly compensate  
engineers who have had one or more years of post-graduate study?

TUESDAY AFTERNOON, NOVEMBER 8, 1921

This session was devoted to a symposium on "Methods of Improving  
the Quality of Engineering Instruction," participated in by Deans J. R.  
Benton, College of Engineering, University of Florida; O. J. Ferguson,  
College of Engineering, University of Nebraska; and O. M. Leland, College  
of Engineering, University of Minnesota.

## IMPROVING THE QUALITY OF ENGINEERING INSTRUCTION

J. R. BENTON, University of Florida. The title of this discussion may seem to imply that the quality of instruction given in our engineering colleges is inferior. I do not think that it is inferior, on the whole, to that given in colleges of other kinds. I do think it is inferior to what it should be.

The present discussion is concerned, I take it, solely with the quality of engineering instruction, and not with its scope, content, or methods, excepting in so far as their consideration may be inseparable from that of quality. To use engineering terms, we are not concerned just now with changing the plans and specifications for engineering education, but with the question of the proper execution of those plans and specifications.

The plans and specifications to which we work are our curricula and programs of work in the various courses of the curricula. These have been ably and thoroughly discussed by Dr. Mann in his *Study of Engineering Education*. I believe that by this time his recommendations have been pretty generally adopted, and that our curricula are now freed from the over-crowding of which he so justly complained, that the main emphasis is now being placed on fundamentals rather than on special applications, that due attention is given to motivating the work of the students, and that every effort is being made to maintain contact with actual industrial work.

To improve the quality of engineering instruction at this time, the most effective steps that can be taken in most colleges are not, I believe, in the direction of any radical changes, but rather in the very unspectacular matter of removing certain adverse conditions. Some of these are the following: Students are taught in too large groups to permit proper individual attention to each one; instructors are over-burdened with routine work, inevitably lowering the quality of their teaching; the time of teachers and other officers is too largely occupied with the less able and earnest students, to the neglect of the more capable and ambitious ones; too large a part of the teaching is assigned to inexperienced young assistants, especially in the student's first year when he is most in need of capable instruction. All these conditions have been growing worse in many colleges in the last few years, due, of course, to the great increase in number of students admitted.

The increased demand for engineering education, which is gratifying as evidence of general confidence in the value of that type of education, has resulted in an increase in quantity of instruction given, without improvement in its quality. With a different policy in college management, the increased demand might equally well have led to an improvement in quality of instruction without increase in its quantity. Be this as it may, we have a situation in which the best hope for improving quality of instruction lies in correcting the disproportion between quantity and facilities—a matter which has been receiving much attention in our tax-supported engineering schools, but one which, I venture to assert, has usually been handled in a very un-engineering manner.

The usual policy has been to admit all applicants who meet the entrance requirements and pay the fees, giving no regard whatever to the demand for technical graduates and too little regard to the capacity of

the institutions. It seems to me that the engineering spirit would suggest a different procedure, as follows: First, to ascertain as nearly as possible what the future demand for technical graduates in the various branches is going to be; second, to provide facilities for turning out that number of graduates and no more; third, to admit students up to the limit of these facilities and no more.

Would such a program be desirable? Would it be practicable?

That it would be desirable, I am firmly convinced; if for no other reason, because it would at least provide definite, orderly, and logical principles for limiting enrollment or for stimulating its increase, as conditions may require—principles fair alike to the student, the industries, the engineering profession, and the taxpayers.

That it would be practicable, I am not prepared to assert. Various difficulties would make a strict adherence to it impossible. In recognizing this, I still wish to maintain that it should furnish the guiding principles towards an adjustment between the facilities to be provided and the number of students to be admitted, an adjustment which must be made if good quality of instruction is to be sought at all. The fact, which I freely concede, that other and sometimes conflicting considerations would have to be given due weight, furnishes no reason why great weight should not be attached to those just put forward.

If these considerations are to receive attention, certain information should be sought which is not now readily available. In the first place, there is need for data on which to estimate the demand for technical graduates. Such data would include statistics on the number of men now engaged in the various branches of engineering; on the number of technical graduates admitted annually to the employ of those companies which have inaugurated definite plans for employing technical graduates; on the sort of employment found by the graduates of the colleges upon graduation; on the remuneration of technical graduates in comparison with other men, as an indication of the extent to which engineering education pays economically. If such data were compiled and interpreted, an answer should be found to the question whether and to what extent the colleges have been turning out too many or too few technical graduates. I wish that the Carnegie Foundation would get Dr. Mann or some similarly qualified expert, to make an estimate of the needs of our country for engineers of various kinds, just as Dr. Flexner estimated the number of physicians needed, when he made his study of medical education for the foundation. Convinced of the value of such an estimate, I would go so far as to suggest that this association request the Carnegie Foundation to have one made.

Comparing the estimated number of technical graduates needed with the number actually graduated annually, a number already known, each college could determine whether the general situation called for limitation of enrollment or for stimulation of its increase. If limitation were decided on, improvement in quality of instruction could be attained from that alone, by admitting the best qualified applicants only.

In either case, having determined on the enrollment to be provided for, the next step would be to estimate the capacity of the college and see whether teaching force and other facilities need to be increased or not. This estimate would involve such matters as the number of scheduled

hours to be demanded from an instructor, size of recitation sections, and other matters about which there are differences of opinion as to what is proper. For this and other purposes, it would be convenient if there were some recognized set of specifications, similar to those adopted last spring by the Southern Association of Colleges and Secondary Schools, to define what should be considered good practice regarding quantity of teaching per instructor, size of class sections, qualifications of instructors, and similar matters. To my mind it is desirable that some such body as our association, or the Society for the Promotion of Engineering Education should set up specifications of this kind.

To sum up, the thoughts aroused in my mind by the question of improving the quality of engineering instruction are as follows:

First, in the present state of affairs, improvement in quality of instructions can best be attained by correcting adverse conditions that have arisen from too rapid growth of student enrollment.

Second, to decide whether the correction ought to be made by increasing facilities or by limiting enrollment, there is need for elaborate statistical study of the demand for technical graduates; it is recommended that this association request the Carnegie Foundation to make such a study.

Third, having determined on the number of students to be instructed in the various lines, each institution should make a survey of its facilities and teaching force, and see that they are properly proportioned to the amount of instruction to be undertaken. In this, it would be helpful to have some recognized set of standard specifications governing quantity of teaching per instructor, size of class sections, and the like. The view is expressed that either this association or the Society for the Promotion of Engineering Education would do well to draw up such a set of specifications.

O. J. FERGUSON, University of Nebraska. The problem of engineering instruction is a vital one which can not wholly be solved by "methods." A more nearly complete solution is the "born teacher." Some things may be done to improve teaching, however, by way of attention to details of the work and the personality of the teacher. That these fail in effectiveness is patent, for, despite the multitude of things that have been done to quicken teaching, no one yet claims perfection for it.

There are faults peculiar to the novitiate, and faults due to long-time service. Certain troubles come from a lack of contact with outside engineering; and I have seen the class period habitually become an experience meeting with only the instructor allowed to testify. Undesirable results may arise from too abject dependence upon superiors and associates. Militant independence is a curse of curses. But, let me be specific.

(1) A new-born instructor should not be bound too tightly in the swaddling clothes of precedent and subserviency. Even as we coax and wheedle students, hoping against hope that they may some day think, so should we watch, study, encourage the young instructor. Let us learn his viewpoint. Assure ourselves that he has a due appreciation of the fundamental difference between an engineering education and a trade-school education; that he is not trying to "fill up" the student from his inexhaustible supply of unaged wine. Then, give him responsibilities that will develop his individuality. He may prove to be a better man than



we! It does not lend itself well to permanency of staff, but I believe that any worthwhile junior instructor may be expected to grow faster than his job does.

(2) Upon departments of instruction rests the burden of proving themselves. At departmental meetings, therefore, it is timely to analyze courses offered in order to apprehend, first, their objectives and, next, the methods to be used. The peculiar content of a course should be recognized and the points of contact and ranges of overlap with other courses established. Point out, for example, that a class in illumination may well pause for a moment to discuss the etymology of the term "lumichromoscope." This practice will give an appreciation of other subjects and will tend to unify the curriculum. Following these departmental introspections, interdepartmental meetings of the same nature might be held, at which the men who are doing the teaching are present as active participants. This should still further introduce unity of plan and effort. The Romans built many a sturdy structure without the use of cement, but we today incline more to monolithic concrete.

(3) Upon the basis of interdepartmental appreciation and respect may be built interdepartmental cooperation. Autonomy is not synonymous with isolation. Jealousies are most generally based upon fears and suspicions.

The cooperation to which I refer is concrete. Agreement will make it practicable, for example, for a course in radio communication to be given by the department of electrical engineering, assisted in some of the more delicate laboratory work by the department of physics. A course in strength of materials may be greatly enhanced in value by cooperation among the testing laboratories, the metal working laboratories, and the department of chemistry.

(4) In passing, I must make one comment upon the experienced teacher. I have observed that frequently he is found entering the classroom with only a hazy idea of the day's specific assignment, putting his entire dependence upon a broad familiarity with the subject and his right to ask questions rather than answer them. The instructor who does this frequently, will demoralize his class work. The student will give him small credit for his major knowledge, strict condemnation for his minor defection—and will then proceed to enter class with the same kind of daily preparation.

W. N. GLADSON, University of Arkansas. Instruction of undergraduate engineering students should be continual drill in fundamental principles. Reliable, well written text-books on engineering subjects are available and there is little excuse for purely lecture courses. The instructor should confine his lectures to enlarging on the text by bringing to his classes new information along lines of recent developments, problems from actual engineering experience bearing on the subject in hand, rather than to discard well tried texts and present the subject in lecture form (with mimeographed notes which are usually scattered and lost), as has been the custom of some instructors.

We may not impress our classes with our own importance and familiarity with the subject in hand as much by using text-book recitation and problem methods as we do by lecturing and distributing copies of the

lecture to the class. But in my opinion the student will acquire a better knowledge of the subject if he has an assigned lesson on which he knows he will be questioned before the class.

The demand of the times seems to be for a broadening of engineering courses of study by adding what are popularly called "citizenship" courses, business training, general economics, and the like. Undoubtedly, engineering instruction can be improved by frequent conferences of engineering teachers in a given institution for the discussion of curricula and methods of presentation suited to the particular classes of students who are to receive the instruction, and by conferences between engineering teachers who direct the engineering work of different colleges.

Small institutions are often influenced by what larger ones are doing and are prone to mimic methods which may have been found successful in the larger college but which may not apply to local conditions.

O. M. LELAND, University of Minnesota. How can we improve the quality of our instruction? That is the question. The answer is, Teach more effectively! Teach better!

Teach is an active, emphatic verb. We should teach actively, not passively. We should inoculate the students, not merely expose them to knowledge. The important thing is to teach, not to leave it entirely to the student to take what is offered him. When he has duly applied for instruction, that is, has registered for the course, give it to him seriously and see that he takes it.

The tendency of college students is away from study and towards the so-called "activities," when the studies themselves should be the activities. This has been true for years, but the distraction of the war increased the tendency. Athletics, popular journalism, amusements, and the like, divert the student's attention. And this is possible because we let them slip along in their studies without working as they should. It is partly our own fault. We do not hold to a good standard of work as we ought, although we are awakening to the need of doing so.

Also our freshmen come to college without the preparation we desire; the "slipping through" habit seems to be getting back into the high schools. We say they do not know how to study, how to apply themselves. Of course, many of them, perhaps most of them, do conscientiously try to study, although not very intensively or steadily, I'm afraid. What can we do to improve these conditions? How can we help the student to work, to be industrious to some extent, and effective?

In my opinion, we can accomplish a great deal by using more elementary and direct methods of teaching—by so arranging our lessons as to require the student to hand in some written results each day. He can work at problems or reports or designs much more effectively than he can read descriptive matter or study mathematics or listen to lectures. He can keep his mind on the subject if he has to write about it. We have a standard unit of work that is supposed to require of the average student three actual hours per week for each hour of credit. We should plan our work so that this is true each week and preferably each day. But we should be fair about it and not require too much. The ordinary lecture system is opposed to this. Note-taking during lectures takes the student's attention from the lecture and he misses half of it at least. Complete

notes should be provided for him and he should be required to show the written results of two hours' outside work for each lecture.

Recitations should be so conducted that every student will be tested each day, if possible. This will mean written work at seats and black-board but need not exclude discussions and explanations. Let the student know that his work is marked every day and that he is held for every lesson.

I expect these suggestions to be received with quiet disdain, unfavorable criticism, or even open resentment. The average instructor will disclaim responsibility for the student's work when he has given him a chance to get it by properly going after it. In other words, he exposes the student to the subject but it is not his fault if the student doesn't get the disease. A college student ought to know the value of an education and that he himself is the loser if he does not take advantage of his opportunity. Why spend valuable time to force instruction into the student when he doesn't exert himself sufficiently to get it? Also who wants the drudgery of looking over papers and problems every day; it's beneath the dignity of the university professor and consumes time better given to research, or, if assistants are used for this work, it costs money. Then, too, it is a reflection upon the good intentions and sincerity of our student body, etc., etc.

My answer is that we have a duty to our students beyond merely letting them learn if they can—beyond giving them some sort of a chance to study. We should help them to overcome their difficulties in applying themselves to their studies. We should not be content with encouraging them to work, nor should we depend upon them to work just for the joy of it or the pleasure of accomplishment; these will come later if our teaching is successful, perhaps. But we should so arrange our lessons that we can make the students work at them every day and show daily results.

While over-standardization should be avoided, our large enrollment requires some business-like efficiency. We may hold heads of departments responsible, but can we get good results by delegating responsibility to every separate instructor without intimate supervision?

I admit that I am advocating elementary methods of instruction. I feel that we need them. Our object must be to turn out the best product we can from our given materials. We are too apt to be content with our methods without studying the resulting product. When our raw material is not what we expect our treatment must be modified to correspond, in order that the quality of the product may be maintained and also improved.

WEDNESDAY MORNING, NOVEMBER 9, 1921

The first paper at this session was the following by L. E. Blauch of the United States Bureau of Education:

THE HISTORY OF ENGINEERING EXPERIMENT STATIONS  
BY L. E. BLAUCH

It is the purpose of this paper to set down a number of facts which may have value for those interested in the engineering experiment station. The data are from college catalogues, reports, proceedings of the Association of Land-Grant Colleges, a questionnaire sent out by the Bureau of Education, and from various miscellaneous sources.

## DEVELOPMENTS IN EUROPEAN COUNTRIES

The experiment station idea is not of recent date, though it has come into its greatest prominence only within the last two or three decades. The beginning seems to have been made in agriculture through studies at Rothamsted, England, begun in 1843. Eight years later the first publicly supported agricultural experiment station was organized in Germany. By and by as the laboratory was adopted in the study of the natural and physical sciences, the number of agricultural experiment stations was greatly increased, so that at the present time practically all European countries have provided such means for the investigation and study of agriculture. It would be very difficult indeed to estimate the great importance of these stations in promoting agriculture.

Some time after the beginning of the agricultural experiment station movement, another series of activities in Germany resulted in the establishment of mechanic arts experiment and testing stations in that country. The most famous of these stations is the one which constitutes a part of the technical institution in Charlottenburg. The founding of such institutions was a part of the plan adopted to further the industrial development of the nation by promoting research and the applications of science to industry. Their influence on industrial and commercial progress has undoubtedly been an important factor in Germany's rise in the years subsequent to 1871.

Another field of investigation which adopted these methods was biology. The famous biological station at Naples dates from 1872 when young Anton Dorn left the laboratories of Jena to set up an institution by the sea where he and other students of biology could pursue their investigations of marine life. Since that time many other biological stations have been established in European countries. Some of these are laboratories, which are used both for instruction and for investigation, while others are experiment stations and are engaged in research only.

A fourth group of experiment stations in European countries is given to the study of conditions and methods of forestry. A noted station at Zurich carried on from 1900 to 1918 a series of important investigations on the effect of forests on stream flow. Other experimentation has made it possible to reforest large areas of the French Alps and to render productive many other waste lands in France and in other European countries.

Such are several forms of experiment stations which have been adopted by European countries in the study of their economic and industrial problems. The depletion of their resources and the increasing press of population upon the means of subsistence has made necessary the careful and intensive investigation of ways and means of increasing wealth and of conserving the natural products producing them as economically as possible. In such a situation the experiment station or some similar organization is a very important feature in promoting the welfare and happiness of the people.

## DEVELOPMENTS IN THE UNITED STATES

Progress has also been made in the United States in provision for scientific research along lines mentioned above. As in European countries, so also in America, the agricultural experiment station was the first to

become important. From humble beginnings, as early as 1856, these establishments have been developed very rapidly in agriculture, so that now every State in the Union has an agricultural experiment station (some two) and a number of States have set up branch stations. The stations are State-controlled.

Three forms of experiment stations have been set up in various parts of the United States by the Federal Government. One group of these consists of biological stations, the first of which was established at Woods' Hole, Massachusetts, in 1883, by the United States Fish Commission. This station was used for fish culture and for experiments and other research pertaining to marine life. Four biological stations are now operated by the Bureau of Fisheries of the Department of Commerce in its work of propagating fish, mussels, etc., and in carrying on research relating thereto. The last one established is a fresh water station at Fairport, Iowa.

The forest experiment stations comprise a second group of research institutions established by the Federal Government. Between 1908 and 1913 the Forest Service of the Department of Agriculture set up six of these agencies in western States. Several of them have done important work looking toward a more scientific and intelligent forestry practice in this country. Because of financial exigencies, the progress of this work has been materially interrupted, but the outlook is now reported as much more favorable. Two new stations have recently been established in the Appalachian Mountains.

A third group of experiment stations directly under the Federal Government are in charge of the Bureau of Mines of the Department of the Interior. These have to do with problems of mining, with the proper and economic use of mine products, and so forth. The first of these stations was established in 1908 at Pittsburgh, Pennsylvania. Thirteen mining experiment stations are now in operation and two more have been authorized by Congress. A number of them are established at State universities and mining schools with which they cooperate. Examples are the stations at the University of Illinois, the University of Wisconsin, the University of Arizona, and Ohio State University. Several stations are housed in buildings provided by the schools.

Such are four types of experiment stations to be found in the United States. The agricultural stations are State, or rather State-Federal, institutions, established and controlled by the States and subsidized by the Federal Government. The other three groups of experiment stations, the biological, the forestry, and the mining, are Federal supported and are under Federal control. The purpose in mentioning these forms of experiment stations is to call attention to two things, first, a number of lines of investigation are finding it profitable to adopt the experiment station, and, second, some of the stations are State, while others are Federal institutions. Thus in agriculture, the States together with the Federal Government are trying to meet the needs, while in other lines the States seem to have done comparatively little and have left the field to some other agency, the Federal Government in this instance. The Federal Government has thus begun research where it has been neglected by the States. What is to be the course in engineering research?

## THE ENGINEERING EXPERIMENT STATION IN THE UNITED STATES

From this brief sketch of experiment stations in general, attention will now be turned to the engineering experiment station in the United States. The idea was first promulgated in America in 1896 when a paper on Engineering Experiment Stations, read before this association, advocated a station in every State and Territory. For several years following there was some agitation looking toward such development, but nothing practical resulted therefrom. The founding of these organizations for research was led by the University of Illinois, whose board of trustees in 1903 established an engineering experiment station to stimulate and elevate engineering education and to encourage the study of engineering problems vitally related to the public welfare. A few months later the State legislature of Iowa appropriated \$6,000 for the engineering department of the Iowa State College of Agriculture and Mechanic Arts. Through this act an engineering experiment station was established at the latter institution. Other States followed, so that there are now according to reports, seventeen stations at land-grant colleges. Four State universities, other than land-grant colleges, have also organized stations.

It should be noted here that a number of schools of engineering, which maintain no stations do, however, carry on a considerable amount of research. The Massachusetts Institute of Technology, for example, has a Division of Industrial Research which is carrying on experimental work on a large scale. This seems really to be an experiment station in all but name.

A number of details concerning the engineering experiment stations in land-grant colleges may be briefly stated. The stations in Iowa, Wisconsin, and Ohio were established through acts of the State legislatures, the one in Pennsylvania was established by the school of engineering and the rest are the results of action by the boards of trustees. In four States, the State legislatures allot the funds for the stations, while in other States the boards of trustees attend to this matter. In general the members of the faculties conduct much, or most, of the research, but in several of the larger stations a considerable amount of outside assistance is employed. The dean of the college of engineering is generally the director of the station. Other details are included in the table which follows:

ENGINEERING EXPERIMENT STATIONS AT LAND-GRANT COLLEGES<sup>1</sup>

State	Year in which station was established.	Funds available for supporting research, 1921-22	Number of bulletins published by the stations	Lines in which the station specializes
Illinois .....	1903	\$80,860 <sup>2</sup>	132	A wide range of subjects.
Iowa .....	1904	45,000	62	Highway research and many other lines.
Missouri .....	1909	7,500	22	Investigations of popular interest.
Kansas .....	1910	6,750 <sup>3</sup>	10	Road materials and agricultural engineering.
Ohio .....	1913	10,000 <sup>4</sup>	3 <sup>5</sup>	Fuel investigation.
Wisconsin .....	1914	5,000	9	Hydraulics, metallurgy, steam and gas engineering, and other lines.
Texas .....	1914	3,000	24	Roads.
Pennsylvania .....	1915	8,300	30	Heat transmission.
Maine .....	1915	None	7	.....
Indiana (Purdue)....	1917	25,000	8	Nitrogen fixation, road materials, tractors, carburetion.
Utah <sup>6</sup> .....	1918	.....	...	.....
Washington .....	1919	5,000	7	.....
Maryland .....	1920	6,500 <sup>7</sup>	2	Highway research.
Tennessee .....	1921	2,000 <sup>8</sup>	...	.....
West Virginia .....	1921	6,000	...	.....
Arkansas .....	1921	.....	...	.....
Nevada .....	1921	Uncertain	None	Not determined.

<sup>1</sup> In Colorado engineering research was organized in 1919 as a branch of the agricultural experiment station. In 1920 it was reported that \$15,000 had been expended during the year.

<sup>2</sup> "Not including about \$20,000 of trust funds for cooperative investigations nor any part of salaries of teaching staff or rental for use of college equipment."

<sup>3</sup> Plus fees.

<sup>4</sup> In addition to \$400 per month "for other purposes."

<sup>5</sup> In addition there are 17 engineering college bulletins and 8 engineering experiment station circulars.

<sup>6</sup> Active work has been postponed for the present.

<sup>7</sup> There is no definite appropriation. The amount stated was spent in 1921.

<sup>8</sup> Approximately.

A study of the available data convinces one that progress is being made in establishing engineering experiment stations at land-grant colleges, but that this new form of organization is being effected rather slowly. Several difficulties are in the way. One of these is a lack of funds. A second is a dearth of men who are trained and interested in research. A third is a lack of interest due in part to the difficulties just mentioned.

## FEDERAL AID FOR ENGINEERING EXPERIMENT STATIONS

This slow development, together with other reasons, led a number of those interested to advocate Federal aid for such stations along precedents laid down through the agricultural experiment station legislation. The first attempt at such legislation was made in 1897. It was tried a second time in 1907. The third effort began partly as a result of the organization of the Land-Grant College Engineering Association. Through the work of this association a bill was prepared, which was introduced into the

Senate by Senator Newlands in March, 1916. Two Senate documents were printed on it and in June, 1916, a hearing was had on the bill.

At the suggestion of Senator Newlands a committee of the National Research Council tried to bring together various friends of the main purpose of the bill, some of whom disagreed on its provisions. In September the committee recommended several changes, which action, however, does not seem to have aided the movement materially.

Meanwhile, a group of men interested in an engineering experiment station at the Georgia School of Technology, prepared a new bill which they had introduced into Congress. This was known as the Smith-Howard bill. Its two distinctive features were, (1) that the legislature of each State designate the institution to participate in the Federal aid, and (2) that the Bureau of Standards supervise the work of the stations and co-operate with them. Here the movement for Federal aid seems to be blocked, at least for the present.

This situation calls for a statement of the pros and cons of the issues involved. One of the leading issues which is important from the point of view of the land-grant college, pertains to the location of the engineering experiment stations to receive Federal aid. As has already been indicated, institutions other than land-grant colleges are interested in Federal aid for themselves. Two reasons may be stated for this position. First, several States are supporting their own systems of higher education, that is, systems in which the Federal Government does not participate. It is held that nothing should be done to interfere with the purposes of such States, rather they should be encouraged to strengthen their established way. Second, some of the institutions referred to are equipped to carry on engineering research perhaps as well as, or better than, are the land-grant colleges in those States.

Leaders among the land-grant colleges strongly oppose locating Federal-aided stations at any but land-grant colleges. Four reasons can be mentioned for their attitude. First, the type of research contemplated is industrial rather than academic or professional. The State universities are academic and professional, rather than industrial in attitude and spirit, while in the land-grant colleges this situation is reversed. Second, much of the work contemplated is closely allied to research in agriculture at the agricultural experiment stations, which would indicate that it should be conducted in close proximity to agricultural research. Third, the land-grant colleges are already Federal-State institutions, consequently, Federal appropriations to them are in keeping with a well established policy which they help to round out. To grant Federal aid to other institutions would unfortunately set up a new precedent which would operate to the detriment of those institutions which the Federal Government has been instrumental in bringing into existence. Fourth, since this proposed move has value for military defense the research should be conducted in those institutions which include a military program in their purpose and work, this being the case in the land-grant colleges.

A second important issue is that of the number of such stations which should be supported. It might be argued that only a few should be maintained. The overhead expenses of many stations are great. Engineering problems are less local in their nature than are those of agriculture. In fact, many engineering problems are of such a nature that their solution



is universally applicable while many others pertain to large regions rather than to small sections. Furthermore, the type of ability which is necessary for good research is by no means abundant, consequently many stations could not be properly manned. This being the case a small number of well supported stations might secure the best results and those with the highest economy. Such an assumption might lead to a policy similar to that adopted by the Federal Government in maintaining the various experiment stations mentioned in the earlier part of this paper. By this method the research could be coordinated and duplication could be avoided. Furthermore, there could be a close coordination of specialists engaged in research in a way that would stimulate and benefit all engaged. The Federal Government through some agency could well act as a clearing house.

In opposition to this view a number of statements may be made. First, many stations would stimulate local interest in research and local support of such activity—a factor which is much to be desired. Second, many stations would afford greater opportunity to discover and encourage research ability among college men. This is likewise greatly to be desired. Since research ability is rare and greatly needed, every effort should be made to bring it to light and to develop it. Third, a station at each college would materially strengthen the instruction in engineering. It would help to develop an attitude of research on the part of the faculty and thus increase the value of the teaching force to the college.

When all the reasons, pro and con, are scanned one is likely to conclude that the kind of support the Federal Government should give to engineering research is largely a matter of policy. In any such consideration it is impossible to get away from the fact that our government is peculiarly constituted and organized. We have a central government and within the same boundaries we have forty-eight other governments, each independent in its own way. The line of demarcation between the jurisdiction of the central government and these forty-eight sets of political machinery is clearly drawn in some instances but not so clearly in others. Where the latter is the case the necessity of the occasion is likely to determine the nature of the move made.

Another phase of Federal aid for engineering research may be mentioned, that is, the method of distributing the aid. Practically all discussion has proceeded on the assumption that the aid should be distributed to each and every State as a lump sum to be used as it sees fit. The State can then add to this as it sees fit. The Federal aid becomes the nucleus around which to set up and maintain the station. Undoubtedly this has marked advantages. Events have shown that such a method very effectively stimulates the States to action and that more and more the States depend on themselves after the start is made. In other words, such aid teaches a State the value of a new movement, which is likely later to be supported to an increasing degree by the State.

A second possibility of the method of giving the aid may be mentioned. This is for the Federal Government to aid and support specific projects of research conducted by experts in the experiment stations. This would not afford a particularly strong impetus to the establishment of stations, but it could probably, with wise administration, be made an effective means of promoting research. In this form of aid the amount of support a sta-

tion would receive would depend on its need and its output. The distribution of funds would have to be in the hands of a strictly professional and practical overseer or committee to avoid any and all "pork barrel" tendencies. A number of difficulties are attendant upon such an arrangement. The scheme has its pros and cons as well as does any other possibility. The Bureau of Public Roads is now giving support of such nature in several instances, as are also other divisions of the Federal Government.

In conclusion, it is evident that the engineering experiment station is a phase of the large movement to develop much needed research in many lines. Such investigation is coming more and more into favor as commerce and industry move forward to larger fields of conquest. Certainly, as we see the increasing need of conserving our resources, of using human energy to the greatest advantage, of doing the thousand things which ever wait at our door, we shall more and more realize the need for well developed research in engineering which the engineering experiment station is intended to promote.

The following paper was presented by Anson Marston, Dean, Division of Engineering, and Director, Engineering Experiment Station, Iowa State College:

#### PROGRESS IN ENGINEERING RESEARCH DURING 1921

BY ANSON MARSTON

This paper is presented as a report of the Committee on Engineering Experiment Stations of the Association of Land-Grant Colleges, of which Deans G. W. Bissell of Michigan, A. A. Potter of Indiana, R. L. Sackett of Pennsylvania and the writer are members, the term of the writer expiring this year. This standing committee was established last year by action of the Executive Committee of the association, in accordance with the following recommendations from the Section of Engineering:

"That the president of the association be instructed to appoint a standing Committee on Engineering Experiment Stations, of four members, of whom three shall serve three years each (the first three to be appointed for one, two and three-year terms, respectively) and the fourth shall be the secretary of the engineering section, *ex-officio*.

"That the standing Committee on Engineering Experiment Stations be authorized to act as an agency for the purely voluntary coordination of land-grant college engineering experiment stations, to collect and distribute progress reports of research and publications at the separate stations, to discourage undesirable duplication of work, and to promote concerted action on problems requiring research in more than one State.

"That the Executive Committee be authorized to finance the work of the Committee on Engineering Experiment Stations."

The progress of engineering research was interrupted violently by the World War, has only recently caught up to its normal pace, and is now taking on marked added impetus. The year 1921 probably is the first which has surpassed prewar annual achievement in engineering research.

**DEVELOPMENT OF ENGINEERING EXPERIMENT STATIONS AT LAND-GRANT COLLEGES**

The establishment in 1920 by the Association of Land-Grant Colleges of a standing Committee on Engineering Experiment Stations was an important step toward the development of engineering research in every State in the Union at the State and national educational institutions.

During the past year this committee has carried on its work in a modest way. The secretary has put out in mimeograph form a quarterly publication, giving information to the various land-grant colleges on the activities of the engineering experiment stations in the various States. Only \$53.63 has been spent on this publication during the past year. Nevertheless, it is hoped that it may be the beginning of an "Engineering Experiment Station Record," which in the end will not be second in volume or in quality to the agricultural Experiment Station Record which is published monthly by the United States Department of Agriculture.

During the year 1921 four new engineering experiment stations have been organized—respectively in Arkansas, Nevada, Tennessee, and West Virginia. This makes a total of 19 existing engineering experiment stations at land-grant colleges, so that 40 percent of our States already have such stations. In addition, the seven States of Kentucky, Michigan, Minnesota, Montana, North Carolina, Vermont, and Virginia report that the prospects are favorable for the early organization of engineering experiment stations at their respective land-grant colleges.

From answers to questionnaires recently sent out by Dean Sackett and the writer the following table of statistics on engineering research at the land-grant colleges of the continental United States has been prepared:

**STATISTICS OF ENGINEERING RESEARCH AT THE LAND-GRANT COLLEGES OF THE  
CONTINENTAL UNITED STATES, NOVEMBER, 1921**

State	Date engineering experi- ment station founded	Annual engineering re- search funds	Staff		Engineering research bulletins			
			Full time	Part time	Total	Total engineering ex- periment station	Station, 1920	Station, 1921
Alabama .....	None	.....	...	0	0	0	0	0
Arizona .....	<sup>1</sup> None	.....	...	0	...	0	0	0
Arkansas .....	1921	0	0	3	0	0	0	0
California .....	None	.....	0	...	<sup>2</sup> 18	0	0	0
Colorado .....	<sup>3</sup> 1919	<sup>4</sup> \$10,900	1	3	21	0	0	0
Connecticut .....	None	.....	0	...	...	0	0	0
Delaware .....	None	.....	0	...	...	0	0	0
Florida .....	None	.....	0	...	0	0	0	0
Georgia .....	None	.....	0	...	...	0	0	0
Idaho <sup>5</sup> .....	None	.....	0	...	2	0	0	0
Illinois .....	1903	93,110	10	58	124	124	3	<sup>6</sup> 7
Indiana .....	1917	25,000	5	8	14	10	3	<sup>6</sup> 4
Iowa .....	1904	45,000	7	17	62	62	3	4
Kansas .....	1910	<sup>7</sup> 6,750	1	33	10	10	0	1
Kentucky .....	<sup>8</sup> None	3,000	1	1	...	0	0	0
Louisiana .....	None	.....	...	...	...	0	0	0
Maine .....	1915	0	0	0	10	7	0	0
Maryland .....	1920	About	...	...	...	...	...	...
Massachusetts ...	<sup>10</sup> 1920	<sup>10</sup> 6,500	0	8	0	0	0	<sup>9</sup> 2
		<sup>10</sup> 75,000	<sup>10</sup> 15	<sup>10</sup> 100	?	<sup>10</sup> 40+	<sup>10</sup> 40	?
Forward .....	9	\$265,260	40	229	261+	253+	49	18+

<sup>1</sup> Agricultural Experiment Station conducts irrigation research. State Bureau of Mines, with engineering dean as director, conducts geological and ore dressing research, employing 5 full time and 4 half time men.

<sup>2</sup> Division of Publications, Engineering Section, publications not necessarily research.

<sup>3</sup> Branch of Colorado Agricultural Experiment Station. Funds given are the average from July 1, 1920 to June 30, 1922.

<sup>4</sup> Maintain road materials laboratory. Mining research is at School of Mines.

<sup>5</sup> Seven or eight by January 1, 1922.

<sup>6</sup> Four or five by January 1, 1922.

<sup>7</sup> Besides fees.

<sup>8</sup> Hoping for early organization.

<sup>9</sup> Two or three by January, 1922.

<sup>10</sup> Maintains Division of Industrial Cooperation and Research, which is practically an engineering experiment station, but its research is not exclusively engineering and its functions include industrial cooperation. The data given here are for staff and funds and publications devoted to engineering research. Hence the figures are approximate only, as no exact division could be made as between engineering research and general scientific research.

STATISTICS OF ENGINEERING RESEARCH AT THE LAND-GRANT COLLEGES OF CON-  
TINENTAL UNITED STATES, NOVEMBER, 1921—*Concluded*

State	Date engineering exper- iment station founded	Annual engineering re- search funds	Staff		Engineering research bulletins			
			Full time	Part time	Total	Total engineering ex- periment station	Station, 1920	Station, 1921
Forward .....	9	\$265,260	40	229	261+	253+	49	18+
Michigan .....	<sup>11</sup> None	0	0	...	...	0	0	0
Minnesota .....	<sup>12</sup> None	...	0	13	?	0	0	0
Mississippi .....	None	...	0	...	...	0	0	0
Missouri .....	1909	7,500	0	4	22	22	2	1
Montana .....	<sup>13</sup> None	0	...	...	...	0	0	0
Nebraska .....	None	...	0	...	...	0	0	0
Nevada .....	1921	?	0	6	<sup>14</sup> 1	<sup>14</sup> 1	0	<sup>14</sup> 1
New Hampshire .....	None	...	0	...	...	0	0	0
New Jersey .....	None	...	0	0	0	0	0	0
New Mexico .....	None	0	0	...	0	0	0	0
New York .....	<sup>15</sup> None	?	4	?	?	0	0	0
North Carolina .....	<sup>16</sup> None	1,000	0	...	...	0	0	0
North Dakota .....	None	...	0	...	...	0	0	0
Ohio .....	1913	14,800	2	9	20	12	1	8
Oklahoma .....	None	...	0	...	0	0	0	0
Oregon .....	None	0	0	...	0	0	0	0
Pennsylvania .....	1915	8,200	5	4	30	30	2	<sup>17</sup> 2
Rhode Island .....	None	...	0	0	0	0	0	0
South Carolina .....	None	0	0	0	...	0	0	0
South Dakota .....	None	...	0	...	0	0	0	0
Tennessee .....	1921	<sup>18</sup> 1,500	0	9	...	0	0	0
Texas .....	1914	3,000	0	3	<sup>19</sup> 3	<sup>19</sup> 3	1	1
Utah .....	1918	<sup>20</sup> 0	0	...	...	0	0	0
Vermont .....	<sup>21</sup> None	1,500	0	2	...	0	0	0
Virginia .....	<sup>22</sup> None	...	0	...	0	0	0	<sup>22</sup> 0
Washington .....	1919	5,000	1	5	2	1	0	2
West Virginia .....	1921	6,000	0	12	<sup>23</sup> 2	<sup>23</sup> 1	0	<sup>23</sup> 1
Wisconsin .....	1914	5,000	1	28	59	9	0	0
Wyoming .....	None	...	0	...	0	0	0	0
Totals .....	<sup>24</sup> 19	\$318,760+	53	324+	400+	332+	55	<sup>25</sup> 34+

<sup>11</sup> Prospects fair for early organization.

<sup>12</sup> Prospects very good for early organization.

<sup>13</sup> There are prospects of early organization.

<sup>14</sup> One or two by January 1, 1922.

<sup>15</sup> Cornell carries on engineering research actively but has no formal organization.

<sup>16</sup> Prospects good for early organization.

<sup>17</sup> Two or three by January 1, 1922.

<sup>18</sup> \$800 to \$2,500.

<sup>19</sup> Total 24 bulletins published but only 3 of real research character.

<sup>20</sup> Active work postponed by after-war deficits.

<sup>21</sup> Expect trustees to organize engineering experiment station in near future, with but small amount of annual funds at first. Two research fellowships of \$700 and \$800 established in 1920.

<sup>22</sup> Now taking steps to begin work. Organization to be by college authorities for present. One bulletin now in view for 1922.

<sup>23</sup> One or two by station in 1921 and one earlier.

<sup>24</sup> There are a total of 7 other States which report prospects favorable for the early organization of engineering experiment stations.

<sup>25</sup> Estimated to January 1, 1922.

From the table above it appears that at least \$318,760 annually are available at the land-grant colleges for engineering research, most of which is spent through the agencies of formally organized engineering experiment stations.

It also appears that 53 men are employed full time in research, and that over 324 others devote part time to the work. A number of this 324 devote as much as half time to research, but the greater number undoubtedly are occupied mainly with instruction duties. The engineering experiment stations which are most firmly established as to age and support are coming more and more to employ full time research staffs. The average engineering faculty member can not safely be assumed to be well qualified to conduct engineering research, which requires men of special training and natural qualification. Moreover, as a general rule the educational duties of part time men conflict with and receive preference over their research duties. Much of the objection to part time work disappears when the full time of a specially qualified investigator is devoted to research during a definite portion of the year. The engineering experiment stations can do work to the best advantage during summer months, on many lines of research, and during the summer vacation can employ to advantage the full time of members of their engineering faculty specially qualified for research, who of course should be paid for their services the same as if they worked for another institution.

The total output of research publications from the land-grant colleges has reached over 400, of which 332 are engineering experiment station bulletins. During the year 1920 only 15 station bulletins were published, exclusive of the 40 reported by the new Division of Industrial Cooperation of the Massachusetts Institute of Technology, but during 1921 at least 34, exclusive of those of the Massachusetts Institute of Technology, will have been issued by next New Year.

A very good illustration of the great volume and varied and valuable character of engineering research possible in a well established engineering experiment station is given in the last issue of the quarterly publication of the land-grant college Committee on Engineering Experiment Stations, in the "Condensed Review of Research Work at the University of Illinois." I hope that every engineering dean of a land-grant college will read this account in detail. An engineering experiment station of similar character and carrying on research to an extent similar or at least proportionate to the resources and needs of the respective States ought to be in operation in every State in the Union.

It is absolutely vital to the interests of engineering at the land-grant colleges that they should have engineering experiment stations, for otherwise, without effective organized provision for engineering research, they must see their agricultural work surpass engineering until the latter is dwarfed and crippled. This fact is the main reason why the land-grant colleges are proceeding without Government support so actively in the establishment of engineering experiment stations. Engineers at land-grant colleges literally must do or die in the establishment of research.

#### ENGINEERING RESEARCH AT NON LAND-GRANT INSTITUTIONS

Activity in engineering research at engineering schools is not by any means confined to land-grant colleges. More and more our great universities are coming to recognize the fact that engineering research is on a plane as high as research in any line. Both Harvard and Yale are co-operating actively in the highway tractive resistance tests now under way in New England.

President Woodward of the Carnegie Institution, speaking of industrial research, has said,<sup>1</sup> "Thus while I would consider this second desideratum in an engineering school not so practicable of easy achievement as the other, I would regard it as of much greater importance to the future of the university and of our country."

It is not essential (as it is at the land-grant colleges) that engineering research at the non land-grant institutions should be organized on engineering experiment station lines, for in such institutions there are no agricultural experiment stations to absorb the resources for research and thus cripple engineering. In these non land-grant institutions the question of organizing engineering experiment stations is purely one of efficiency in research.

Research and graduate work are coming more and more to be recognized as vital activities of our modern engineering schools, whether such schools are located at land-grant colleges or not.

#### RECENT DEVELOPMENTS IN HIGHWAY RESEARCH

One of the most important fields for engineering research at the present time is highway engineering, as was pointed out a year ago before this section by Mr. T. H. MacDonad, chief of the Bureau of Public Roads, who stated that within 13 years the registration of motor driven cars travelling on the public highways had reached 7,568,446, of which not less than 1,000,000 were commercial vehicles. He also stated that within the same 13 years annual funds available for road and bridge construction had risen from \$70,000,000 to \$600,000,000. This tremendous development within such a few years has made it absolutely essential that highway engineers should have a firm scientific basis established for highway engineering practice. At present untold sums of money are being expended without any reliable methods available for determining the efficiency or adequacy of the structures planned. For example, no engineer can make a reliable comparison between the merits of different types of paving which can be constructed for different prices. No engineer can compute the sums which can be expended efficiently in cutting down hills, shortening distances, paving road surfaces and making other highway improvements. We do not possess the knowledge required for the correct design of paving slabs to resist the impact and other destructive effects of motor driven traffic, or the stresses due to temperature changes or to lack of uniformity in the supporting power of the sub-grade, or due to imperfect drainage, to freezing and thawing and other causes.

A vast amount of highway research is urgently needed at the present time. Promptness in the accumulation of the data is vital because the im-

<sup>1</sup> See Proc. Soc. Prom. Eng. Ed., 26 (1918), p. 118.

pending expenditures are so vast. Highway research ought to be carried on throughout the entire United States, so that data for all local conditions can be secured.

It is manifestly important that a coordinating plan of highway research should be adopted for the entire United States, and to this end the Division of Engineering of the National Research Council has established an Advisory Board on Highway Research, which in turn has employed Professor W. K. Hatt, of Purdue, to give his full time for the present as director in the work of coordinating and promoting highway research in the United States,<sup>1</sup> and although Professor Hatt's work was begun only a few months ago its beneficial effects in highway research are already manifesting themselves in a very satisfactory manner.

The United States Bureau of Public Roads is carrying on highway research experiments on a large scale and is securing for the first time some really reliable data on the theory of design of road pavement slabs. In this same field the State of Illinois is doing most important work through the construction of experimental sections of paved roads of different types which are to be tested to destruction by heavy truck, with accurate measurement of the accompanying distortions and stresses. On the Pacific Coast, very important research on highway pavements is under way at Pittsburg, California, largely through private enterprise, but with co-operation from highway authorities and engineers.

In Iowa, a committee of the National Research Council on highway research has been engaged for three seasons in actual experimental work on the economic theory of highway improvement. Its work includes determination of gasoline consumption, tractive resistances, air resistances, internal friction, tire costs, repair and other maintenance costs, labor costs, overhead charges and other fundamental data on the cost of highway transportation, and the effect on each item of cost of transportation of improvements in road surfaces, grades, distances, alignment and other characteristics.

Major Ireland, Quartermaster Corps, U. S. Army, has been working as a member of this committee, conducting very interesting tractive resistance tests in New England, and his work has now developed so as to require the formation of a sub-committee to assist and promote his tests.

The various highway commissions of the country are engaging more and more actively in various lines of highway research.

One of the important recent developments in connection with highway research is the inclusion by Congress in the new Federal Aid Act of the following provision for promoting highway research:

"SECTION 21. That so much, not to exceed 2½ per centum of all moneys hereby or hereafter appropriated for expenditure under the provisions of this act, as the Secretary of Agriculture may deem necessary for administering the provisions of this act and for carrying on necessary highway research and investigational studies independently or in cooperation with the State highway departments and other research agencies, and for publishing the results thereof, shall be deducted for such purposes available until expended.

"Within sixty days after the close of each fiscal year the Secretary of Agriculture shall determine what part, if any, of the sums theretofore deducted for such purposes will not be needed and apportion such part, if

<sup>1</sup> Professor Hatt's office is at 1701 Massachusetts Avenue, Washington, D. C.



any, for the fiscal year then current, in the same manner and on the same basis as are other amounts authorized by this act apportioned among all the States, and shall certify such apportionment to the Secretary of the Treasury and to the State highway departments."

Two and one-half percent of the \$75,000,000 which is agreed upon for 1921-22 is \$1,875,000, from which it is to be hoped that several hundred thousand dollars can be spared for highway research.

It is believed that this provision will enable the allotment of really adequate funds for the active progress of highway research in the various States of the country, utilizing existing agencies and working under the coordination plan referred to above.

#### DIVISION OF ENGINEERING OF THE NATIONAL RESEARCH COUNCIL

One of the important postwar developments in engineering research has been the organization and the gradual development of the activities of the Engineering Division of the National Research Council. During the past year Chairman Comfort A. Adams resigned and A. D. Flinn, of New York City, secretary of the United Engineering Societies, has been elected chairman in his place. It is believed that the present organization will prove quite permanent, and that the value of the work of the Engineering Division will be enhanced thereby.

The Engineering Division of the National Research Council has only sufficient permanent annual funds for administration purposes, and its work is in promoting and coordinating engineering research rather than in financing research. However, it has some backing from the Engineering Foundation which has enabled it to secure financial assistance for an important research on the fatigue of metals, which is being carried on by Professor H. F. Moore of the Illinois Engineering Experiment Station. In general, however, the division can assist in financing research only by helping to secure financial support from commercial organizations, from wealthy individuals, and from National, State, and municipal sources.

The work of the engineering division of the National Research Council is carried on through a gradually increasing number of special committees, each engaged in some specific research. Prior to the recent organization of highway research, as already described above, most of these committees were at work in metallurgical investigations.

#### COMMERCIAL ENGINEERING RESEARCH

The activities of the various commercial organizations which maintain research laboratories should not be overlooked in a discussion of present day engineering research, for the work of such commercial laboratories is extremely important. However, the results of the work in such laboratories are not usually available to the general public. They do work, however, which could hardly be accomplished by outside laboratories. In addition to supporting their own research laboratories, many of the commercial organizations are assisting in general engineering research through contributions of material and apparatus and sometimes money.

## THE CHARACTER OF MODERN ENGINEERING RESEARCH

It seems to the writer that in the past there has been a tendency to divide research into two distinct fields, namely pure research and applied research. Pure research has been carried on mainly by scientists who are not engineers, and the engineer has confined himself mainly to searching for useful applications of the discoveries of the scientists. Whether or not the writer is correct in this view, it seems apparent that the present tendency is for the engineer to devote himself more and more to research into fundamental scientific principles as well as to study their applications. In other words, the engineering research investigator of the present day is no longer content to be a mere artisan in his work. I believe the further development of this change in the direction of engineering research to be desirable and of great importance.

The development in the immediate future of real graduate work in engineering will be a necessary corollary of the present day rapid development of engineering research.

Dean R. L. Sackett, School of Engineering, Pennsylvania State College, presented the following paper:

### EXTENSION EDUCATION AND ITS POSSIBLE SERVICE

BY R. L. SACKETT

#### WHAT IS THE FUNCTION OF A STATE EDUCATIONAL INSTITUTION?

President Birge of Wisconsin University has answered as follows: "It has become the duty of the university or college to reinterpret knowledge for the ends of practice and to convey learning so reinterpreted to the people in such a way as to make it immediately effective in life." I do not interpret the above as meaning that all education should be materialistic or that it should not build for the future as well as serve the present, but that education should be usable. In order to convey knowledge to the people, extramural forms of education must be utilized more largely.

#### WHAT IS EXTENSION EDUCATION?

It may be defined as any form of educational activity carried on at a distance from the college campus. It includes all non-resident instruction.

It began with the English type of extension lecture course, which in fact succeeded the old lyceum. Dr. Frederick Moulton of England came to the United States and established a system of extension lectures for Chicago University. They made their appeal largely to the educated classes of society and were not patronized to any considerable degree by working men.

The old apprentice system in the United States had failed to supply a sufficient number of skilled mechanics and a number of industries were looking for some method of supplementing the shop work by class instruction. Several western railroads organized night classes between 1886 and 1900 for their apprentices, finally making attendance compulsory and moving the classes to working hours and on pay. The apprentice classes

on the Pennsylvania Railroad at Altoona were organized by the Pennsylvania State College as extension classes, in 1911.

If class instruction was good for the apprentice why was it not good for the machinist or electrician?

In 1906 the Pennsylvania State College began its extension instruction and was one of the first to substitute regular class work for the older type of lecture. Since that time many other institutions have organized an extension service department.

#### TYPES OF INSTRUCTION

(1) The lecture method is still used for certain subjects.

(2) A combination of lecture and recitation is employed for certain advanced subjects when a teacher from the institution is sent out, but where alternate meetings are locally conducted with written reports to the lecturer.

(3) The class which meets once or twice a week in the industry before going home for the day is one of the most satisfactory for groups of shopmen pursuing the same subject. The instructor is usually chosen from among the more advanced plant employees or executives. The teacher must know the subject and its applications to the daily work of the students. It is desirable that the plant should supply proper equipment, light, heat and janitor service for works classes of this character. Where there are not enough men in a plant to compose a class, those from several plants may meet in a school building or chamber of commerce building. This latter type of instruction has been called the Pennsylvania Plan.

(4) Correspondence courses have never reached as many students as they do today. This type of instruction serves the needs of the isolated, the advanced student or the one who can go more rapidly than his fellows. The University of Wisconsin has about 17,000 correspondence students—more than any other publicly controlled educational agency. The quality of correspondence instruction has been raised above its level of a few years ago and now constitutes a safe and proper form of education when scientifically administered. For its final service to the student it depends upon clear assignments, carefully formulated questions, and personal touch between student and department. Twelve institutions are now giving correspondence instruction.

(5) Between the correspondence course on the one hand and the regular class on the other, we have developed at the Pennsylvania State College still another form of extension known as the Home Study Plan.

"It is common experience to find in the same class some men of but three or four years schooling and others who are high school graduates. To lay out a course of study to meet the needs of such a group is quite impossible. Some of the men will be anxious to cover several lessons a week, while others will have a capacity of only a few pages at the most. Regardless of the length of assignments, therefore, they will be either too long or too short to hold the interest of many. These objections, together with many others, have been completely removed by the new State College Plan which is, in effect, a combination of class and correspondence study. There the student studies anything he wants regardless of the fact that no others may be taking the same subject. He may select anything along the lines of shop mathematics, drawing, electricity, power plant subjects,

mechanics, strength of materials or design, and his lessons as he desired each week. He is not affected by the shifting hours of labor, by illness or other things interfering with class attendance. He may study over the summer or not as he desires, and yet he gets all the personal instruction from a regular teacher at the plant just the same as regular class students."

We provide the correspondence instruction plus a resident instructor who may be consulted by students in several courses and who assists them, encourages or advises as to the adequacy of their preparation for a given course and thus serves as a local supervisor.

Courses for college credit are now given as a regular part of the extension curriculum by a number of institutions, such as the universities of Chicago, Wisconsin, and Michigan, and the Pennsylvania State College. The arrangements differ somewhat in the details as the departments giving resident instruction in a given subject are at first skeptical of the quality of the correspondence instruction given, but later observation of its character gives confidence in its integrity. Limits are set as to the amount of college credit which can be earned by correspondence or a specified amount of resident instruction is required. On the whole, extension instruction of collegiate grade is making progress and the quality is being improved to the point where it may be adopted with proper safeguards and the standards of the institution be maintained. We do not permit a correspondence student to do more than the equivalent of a year of resident work. We do not permit a student of poor standing to make up deficiencies by correspondence. The department giving resident instruction improves the content of the course, the examination questions and the grade.

#### WHAT SUBJECTS ARE TAUGHT BY EXTENSION METHODS?

The early extension lecture courses were confined to literature, economics, and civics, but the demand for industrial subjects has led to the development of shop mathematics, electricity, elementary engineering, textile design, drawing, steel, and concrete design.

Debating clubs have been supplied with material, package libraries have been circulated, and visual instruction has been given an almost unbelievable impetus. Slides and films are supplied by the University of Wisconsin with ready-made lectures to accompany them, on a wide variety of subjects. This type of instruction does not appeal to the layman as being anything more than entertainment, but it has possibilities not yet exhausted as an adjunct to serious instruction.

The subjects given by the University of Wisconsin Extension School now cover a remarkable range and extend from secondary school subjects to the post-graduate study of medicine.

The field of correspondence study is limited to courses not requiring field or laboratory instruction except where local laboratories are available to the student. But there seems to be almost no limit to the scope of extension service, if we employ the type of instruction best adapted to the subject and the student.

#### HOW IMPORTANT IS THE SERVICE?

The popular value of an article is best attested by the number buying it. The actual value may be different. In the case of extramural forms of instruction, the best test is the effect of such aid on the feelings and

future of the student. The majority of them are of mature years and for one reason or another did not complete their high school education or did not have the opportunity of attending a vocational school and now desire to supplement their knowledge without leaving their positions.

The facts developed in the last few years leave no doubt that many believe their promotion due in part to their extension courses and the increased knowledge so obtained.

The demand for such instruction shows that in the minds of their fellow workmen the instruction is helpful. It stimulates them; gives them something useful to think about if occupied on semi-automatic work and tends to occupy their free time in a more systematic way than most men would use it if not pursuing some such organized study.

#### HOW IS IT ORGANIZED?

The organization of an extension division school or college is an administrative matter not included in this discussion.

The methods used to bring the extension classes or courses to the attention of prospective students is most important, at least in the early years when the work is being promoted. With industrial employees we find that a man who has had shop experience and knows the mental traits of the groups is the most desirable organizer. He explains the nature of the courses in which the group might be interested, organizes a class or arranges for their correspondence instruction.

Publicity is easy to obtain for any such public service by organized newspaper notices distributed to the press of the State.

Such work is usually financed by the student paying a fee which meets or helps to meet the cost. Where the State supplies funds generously, much more can be done and a wider variety of service be performed. Where the funds supplied by taxation are small, a larger proportion of the cost must be assessed against the student.

#### IS EXTENSION INSTRUCTION A PROPER FUNCTION FOR A COLLEGE OR UNIVERSITY?

This subject has been frequently discussed at gatherings of university and college faculties. Some have feared the effect of the reputation of correspondence courses upon their academic standing. Some have questioned whether extension education had justified itself. The results from this type of education are easier to prove than those resulting from the usual form of academic instruction. It is more realistic and material; it serves immediate needs. In fact these are the principal charges against extension instruction. Are we committed to any one type of education as fulfilling all the needs of all the people all the time? Obviously one type has not served all our complex needs. The fact that one is good does not prove another form to be bad.

Is not the taxpayer entitled to educational opportunities adapted to his needs and abilities? We have assumed too much that the old forms of academic education provided all that anyone needed of instruction or information; that it presented the fundamental principles of life to the chosen few and thereby did its duty. Our present industrial turmoil indicates that we are a long way from having provided the people with a sound economic philosophy. Furthermore, it is only by some such edu-

cational activity as extension courses that we can reach the majority of those employed.

By extramural instruction it is entirely possible to exert a practical influence on our people at the same time that their knowledge of and skill at their daily jobs are improved. Furthermore, the extension method is today the most effective means of teaching American ideals, citizenship and civics. This is a more important service than teaching the principles of a sound industrial policy.

#### DISCUSSION OF DEAN SACKETT'S PAPER

LOUIS E. REBER, University of Wisconsin. It is gratifying to find that one of the leading engineering educators of the country begins his paper on university extension with the assumption that it is a legitimate function of an engineering college to give extension instruction of lower than college grade. The fear that university instructors might in some way contaminate or degrade the college of engineering by teaching engineering subjects to practical men not prepared to enter college, it would seem, has passed away, and the question has now become not so much whether the teacher should carry on outside instruction as whether or not it is possible to build up an engineering faculty with the qualifications essential for both residence teaching and instruction in the extramural field.

I think it is agreed that a teacher in residence gains in power from experience with outside classes made up of men with more or less wide practical experience engaged, while studying, in work to which the subject taught is specifically related. Correspondence instruction, however, has a technique of its own and requires a man of different type from the ordinary residence teacher. It is rarely that a residence teacher, however valuable in residence work, is a good correspondence instructor, and, furthermore, it may be said that, in the main, good correspondence teaching requires the instructor's first consideration. It is not a question of correcting examination papers but one of teaching. This, generally, is not fully appreciated by the residence teacher who carries correspondence work. Of course, an engineering faculty capable of handling residence and extramural instruction equally well would be ideal, but it would be exceptional. This should be recognized.

#### THE TEXT

The text to be used for a student *in absentia* is also a matter for serious consideration in the discussion of university extension methods.

With credit courses standard texts can, as a rule, be used with supplementary notes, and all the prerequisites which the university or college requires must be imposed upon the student. Sometimes even with credit courses a specially prepared text may be better. On the other hand, it should be emphasized that experience has demonstrated that much better results can be secured in vocational subjects with specially prepared texts than by the use of the ordinary classroom books. It is interesting to note in this connection that a number of the texts that have been prepared for correspondence instruction are now used in the classrooms of universities and colleges, a fact that seems to prove that books prepared for correspondence instruction are equally useful in the classroom. Over 300,000

copies of the 26 texts prepared for correspondence instruction at Wisconsin have been sold by the publishers for other purposes.

#### CREDIT WORK

Although I believe that other institutions, as intimated by Dean Sackett, are using practically the same precautions in dealing with credit students of collegiate grade, the regulations in force at Wisconsin may be of interest.

Only such credit courses are offered for correspondence instruction as are approved by the residence departments, even though the work is done under a separate extension department or division. Examinations for credit at the completion of the courses are held in accordance with the directions of the residence departments. Teachers in the division who do credit teaching are approved by the residence departments doing the same work. The dean of the extension division asks for promotions only with the approval of the dean of the residence college in which similar work is done. In dealing with students who have been conditioned, only those recommended by the head of the department concerned are permitted to remove the condition by correspondence instruction. No failure may be made up by correspondence.

In Wisconsin, while a considerable number of extension students are taking engineering subjects for credits, the larger percentage of such students are taking courses that are preliminary to the distinctly engineering subjects, such as mathematics, English, etc. To illustrate the scope and proved value of this service the work in mathematics may serve as an example. In this department at Wisconsin, a considerable amount of the work for credit may be roughly classified as, (1) the preparation of the student for entrance to the college of engineering, (2) his training in the mathematics of the freshman and sophomore years, and (3) advanced work in theoretical mechanics and differential equations.

Two other lines of preparation are made possible through this department, (1) the preparation of the student who has spent his first year in another college, supplementing his mathematics preparation so that he may continue the sophomore calculus equally well equipped with the regular students in residence, (2) the mathematics training of students in first and second years for other engineering schools.

The proportion of work as estimated from the 1,000 student papers (each paper is considered a week's work) marked in September shows fully 20 percent of the papers marked were in algebra for engineers, about 15 percent were in mathematical analysis, about 10 percent were in sophomore credit courses. The significant point about these figures is that by far the largest part of these students will continue their work in a residence college of engineering.

The percentage of the students in extension courses taking subjects for credit has greatly increased at the University of Wisconsin during the last few years. At the present time, about one-fourth of the 17,000 active students at the University of Wisconsin or other universities, colleges, or technical or normal schools throughout the country are taking work for credit.

Dean Sackett, under the heading, "Types of Instruction," describes, among others, methods of instruction best adapted to industrial extension students. Wisconsin, in its formal extramural teaching as adapted to service in the industries, includes four main types which have become increasingly well defined during the past decades of experimentation and standardization. These are:

Straight correspondence instruction.

Class instruction.

Combined correspondence and class instruction.

Combined correspondence and conference groups.

*Straight correspondence instruction.* This type of service offers many distinct advantages and opportunities both to the student and the instructor. It permits the instructor to give practically personal instruction to the individual students, depending upon their peculiar preparations and plans for the future. Each student does all of the work of the course, and, consequently, receives a proportionally larger benefit than if the instruction were received in a regular class. This type of instruction also permits individuals in certain communities to receive instruction in subjects which could not possibly be offered in class on account of the limited demand. The demand for instruction in any particular subject might be sufficient in the entire State to warrant correspondence instruction but not sufficient in any community to justify a class. The correspondence course is a stimulus to the instructor in that it gives him the first-hand reaction of hundreds of students on the type of text material supplied and the method of instruction used. This finally results in the extension division developing text material which has not only been especially prepared for this work, but which has been thoroughly tried out and tested before being offered to other schools as text material. This text material, published in book form, has already been referred to.

*Class instruction.* This type of instruction is a very popular one, especially in communities where there is a sufficient demand for organized technical instruction. For example, it has been our experience that class instruction in steam engineering is much more attractive to the individual than correspondence instruction. The class gives the instructor the opportunity of making contacts and friendships which naturally result in benefit to the instructor and the student. It gives the instructor the opportunity of becoming familiar with power plants, factories, etc., in the community—a valuable aid in his teaching. Furthermore, a class organization is a useful opening wedge in getting students interested in other extension activities. A great majority of class students continue instruction by correspondence after completing the class. They avail themselves also of such extension opportunities as the package library, the visual instruction and the community development services.

One advantageous feature of an extension class is that it brings to the local community the very latest and best practices in some particular line, fresh from the university.

Class instruction has been conducted along four different lines: as strictly extension work, in cooperation with local continuation schools, in a single industrial plant, or among a group of factories engaged in the same



general activity. It requires an instructor of unusual experience and personality to go to an industrial plant and conduct a class which is entirely satisfactory both to the management and the men.

*Combined correspondence and class instruction.* Educational service of the type in which the student has both the advantage of correspondence and class instruction has been offered in practically every part of the State. It enables the student to profit by all the advantages of the strictly correspondence-study course and at the same time gives him the personal contact with the class instructor. For example, a group of students in a community or industrial plant will be taking correspondence instruction in certain related subjects. This group is met periodically by a class instructor who conducts a class or lecture period as a means of supplementing the correspondence instruction. This combined service has also been conducted as straight extension work in connection with continuation schools, in a single industrial plant, or in a group of related factories.

*Combined correspondence and conference groups.* This type of service is perhaps the most satisfactory to the individual student. The instructor meets students taking correspondence instruction in conference at an appointed hour in the evening, in many cases at the place of their employment, in some cases being permitted by the management to go to the plant during working hours. In some cases the management sets aside a weekly conference hour when students taking correspondence instruction can come to the office and confer regarding any difficulties which they may have. This method is a particularly good one for individuals working in industrial plants because it enables the student to take up with the instructor at his place of work the many problems he runs up against.

A notable example of this type of instruction is that given at the State penitentiary at Waupun. The students who are registered for correspondence instruction have the privilege of a conference with the instructor when he visits the prison. These men who are taking their work under difficulties gain many advantages from this personal contact. A number of inmates have taken a series of subjects leading to a remarkable preparation in a definite field of life work.

The correspondence and conference group calls for an exceptionally good instructor. Not only must he be thoroughly familiar with the correspondence courses, but he must also be familiar with all lines of related engineering work, so that he may be able to discuss intelligently the wide range of problems which are brought to him.

There is rarely sufficient demand in the smaller communities for engineering instruction to warrant the employment of a capable man along these lines. The extension division, however, is able to employ specialists in particular lines and by distributing their services can render a high type of service economically. There is another factor which is worthy of consideration. The instructor from the extension division represents a great institution with a well-known reputation along engineering lines and therefore goes to his work with a recognized standing and background. This, of course, is impossible with an instructor from a local community who has not the general fountain-head of learning and research behind him.

Before leaving the subject of university extension and its peculiar possibilities of service to the industries, mention should be made of the service which a department of business administration in an extension divi-

sion can render to both commerce and industry. Such courses as business organization and management, industrial management, marketing methods, cost accounting for industrials, income tax, real estate, and credits, attract men of high position. A class for business executives, carried entirely by the extension division force, recently organized in a Wisconsin city of about 40,000 inhabitants, is made up entirely of executives of the city, including bank presidents and cashiers, and heads of the leading industrial and commercial organizations of the city. The class is limited strictly to men in important executive positions. Courses of this kind do much toward popularizing extension instruction, making it known, and giving it standing throughout the State.

#### A NEW INDUSTRIAL BUREAU

The necessities of our reconstruction period did much to turn industries toward our State university for aid in meeting the many problems the changing character of industry forced upon them. While there was a great amount of most valuable material effectively organized through extension agencies, the application of the material remained a matter largely for individual initiative.

Recognizing this condition, a Bureau of Commercial and Industrial Relations was organized several years ago for the special purpose of coordinating and synthesizing the material applicable to the development of industry.

In industry there is usually little leisure for formal instruction. Education or training to be sustained and acceptable needs to be "training on the job." Both employers and employees, furthermore, are apt to be too entirely engrossed in their own small problems to get a proper concept of the place their special enterprise should hold in the whole scheme of industry as a public service. Recognizing, then, this tendency of industrial executives to become narrow and provincial, every effort is being made to stimulate thought and discussion in the larger problems of industry which affect the long-run fortunes of industrial society. In this we were considerably aided at the start by the lively interest occasioned everywhere by the change of price levels and the associated economic problems.

A bulletin service was developed in which the fundamentals of industrial relations were treated. These bulletins covered each topic in a two-fold fashion. They supplied a practical working manual drawn from the observation and analysis of concrete instances and attempted to meet the conditions peculiar to Wisconsin. In the second place, they supplied a philosophical and technical interpretation of the significances of these practical manuals. The service proved immediately popular. At the present time our circulars not only cover the State of Wisconsin but are being used in Canada, England, and the offices of the International Labor Bureau of the League of Nations.

This bulletin service was backed up by numerous lectures of a semi-popular character. In Milwaukee they took the form of a six-unit lecture course on labor management.

As we progressed with the work the experience of the bureau soon showed that the resources of our university needed to be more thoroughly

organized. Not only was there a lack of coordinated service, but there was a feeling on the part of the men on the university faculty that they need to bring their theory a great deal closer to the actual administration of industry. Growing out of this consciousness there was organized under the leadership of Professor John R. Commons a group of fourteen men drawn from various departments—psychology, manual arts, psychiatry, education, physical culture, medical service, industrial housing, sociology, and statistics—a synthesized group which looked to this bureau as its channel for communication between themselves and the outside public.

A course in labor management was developed under the chief of this bureau to head up the training of a selected group of students for administrative positions in industry. These students constituted a research corps. Last year this group staged a very impressive exhibit at the national convention of the Society of Industrial Engineers, in which they demonstrated by means of a miniature employment office the theory and practice of labor management. Later this exhibit was repeated in other parts of the State under the auspices of the State Industrial Commission.

This year a foremanship training course is being developed as part of a larger course in the training of executives. The course departs from previous courses in an attempt to restore the foreman to his rightful place as an integral part of the management from which he was originally split off. It approaches the problem of foremanship from the managerial side and attempts to develop the foreman into an effective replica within his own department of the "Big Boss" in the main office. This experiment is being launched through the continuation school of one of our larger industrial centers.

In all the work of the bureau a constant effort is being made to promote a freer circulation between the university and industry with a view to raising the level of the latter and promoting the efficiency of the former, and of accomplishing this by the more effective coordination of existing agencies than by the creation of any new agencies.

The work of this bureau is somewhat unique. No other educational institution, so far as I know, is giving this service. It is believed to have decided possibilities. An expression of opinion as to the value of this work by the members of the association would be helpful.

Other bureaus of the extension division, such as the Bureau of Community Development, Bureau of Visual Instruction, are doing much toward helping to solve the problem of leisure time for men engaged in the industries, in their community life and in their life at the plants, through the cooperation of the industrial companies.

The package library service is used to no small degree by individuals and clubs within industrial plants.

As a means of effective illustration, lantern slides and motion pictures are of special value for purposes of education. By supplying packages in circuits, courses of study may be graphically illustrated week by week and the entire State is given the benefit of the full service. In Wisconsin about 100,000 slides treating 800 subjects, and 4,000 reels of motion picture film are available to borrowers. Eight circuits are now running for a twenty-week period, each circuit using 20 packages. Occasional service includes films and slides on technical subjects for practicing physicians and nurses,

engineers (automotive and others), etc.; also packages suitable for use in churches and for general entertainment.

I am greatly interested in Dean Sackett's view as to the wider use for extension service than that of fitting a man for greater efficiency in his job. In these days of automatic machinery, with the attendant monotony of labor, it is exceedingly desirable that workmen should be given definite instruction in leisure time occupations, or avocations, if contentment is to prevail among the industrial classes. If the well-paid employees in the industrial plants could find their pleasure during hours when not at work in wholesome, legitimate ways, much would be done to quiet industrial unrest and lay the foundation for an enduring democracy. Adult education that is avocational is a matter that needs to be given more attention and opens to university extension a tremendous opportunity to do a great work in the developments of the future.

D. C. FABER, Iowa State College. The subject of extension education service to the industries is of especial interest in Iowa, as the engineering extension department of Iowa State College was established to make available the services of that institution to the industries of the State.

The methods of instruction outlined in the paper under discussion are all recognized as effective aids to industry, although not equally so, as the local conditions, such as types and distribution of industries and their state of development and organization which make certain methods inoperative, render others more effective.

For example, in Iowa it has been found that certain people in some industries can best be served by short intensive courses of instruction of from two days to two or three weeks' duration. The telephone operators schools are typical short courses. The past year seventeen of these courses were conducted at various points throughout the State. The instruction consisted of standard methods of operating in either local or long distance practice and was given in the form of talks, demonstrations, and actual switchboard operation on the part of the students. The average attendance in these schools was forty-five operators. Similar courses are offered to bakers, bottlers, canners, electric metermen and numerous others. The electric metermen's short course is recognized by the electrical industry as an effective educational effort.

In addition to correspondence instruction, extension classes and short courses, a supplementary form of instruction is offered to engineers, firemen, and janitors of the State. A combustion engineer is available to visit the boiler plants of the State and give the men in charge, assistance and instruction in matters in connection with the operation of his plant. Several hundred plants a year are reached in this way.

Another important question from the standpoint of service to industry as well as vocational education is that of foremen training through extension classes. This work is being actively conducted at the present time.

All of the services mentioned above have a dollar and cents value in industry, aside from their educational value to the individual who takes advantage of them.

K. G. SMITH, Michigan State Supervisor of Industrial Education. Dean Sackett speaks briefly of the lecture method as a type of engineering extension instruction. I am glad to note that he does not spend much time

discussing it. The lecture method in engineering extension work is a sort of "Uncle Henry," a dear good old soul who always comes to all the meetings and is regarded with mingled deference and pity by the younger generation.

In engineering extension I believe the field for the lecture is limited. It is the call bell or opening exercise of an extension school and not its serious business. The lecturer is an engineering evangelist whose sermon must be followed by personal work to make it effective. If the popular scientific lecture is to be included, the engineering extension lecture field is more extensive.

It was my pleasure some years ago to be associated with Dean Reber of the University of Wisconsin in developing extension work. We used all the methods mentioned by Dean Sackett. An adaptation of combined correspondence study and class work may be of interest. We had at one time quite a large class in "Heating and Ventilation" in the city of Milwaukee. The class met once a week. I met the group one week and Professor Shealy of the University staff met them the next week. Thus we alternated for twenty-four weeks. As I resided in Milwaukee at that time, this lessened the traveling expense and lightened the burden of Professor Shealy. All written work was turned in to him for correction. This combination of a resident extension worker and a campus professor proved very effective in this case, due perhaps in part to the strong personal friendship between myself and Professor Shealy. The attendance at the class was excellent and the written work turned in was of a high grade.

One development at Iowa State College may also be of interest. In Iowa the term "Short Course" is understood by everyone. It is the shibboleth of the extension worker, particularly as applied to agricultural instruction. One day our secretary, Mr. J. Will Parry, came to me and said, "We have an agricultural short course, why not an engineering or technical short course?" At first I scoffed at the idea. I have since come to believe it is a valuable method of imparting instruction but must be carefully organized, supervised, and manned in order to make it effective. Like the lecture, it is portable but is productive of much more serious work than lectures. A course of lectures and a short course are two entirely different things and resemble each other as a brick pile resembles a house. The short course involves demonstration, exhibits, class work, serious study, or actual manual work on the part of those taking. It should be highly specialized and in the hands of an expert who has a definite aim and who bends all his energies toward the attainment of it. It is not an educational tonic but a dose of highly concentrated medicine to be given only by a competent physician.

As a special development of this work a special one-week's short course for janitors and firemen was given in a number of towns in Iowa with good success. The class met every evening for a week and the instructor spent the day in going from plant to plant and consulting with individual members of the group on special problems. The instruction was based on a small text and the daily experience of the class members. Dean Marston can no doubt tell you of the extended development of the technical short course in Iowa. One great advantage of such a course is the fact that it makes a strong appeal to a definite organization such as master plumbers, stationary engineers, painters and decorators, or a State

canners' association. By means of such a course definite cooperative relations may be set up between the institution and the local, State or national organization.

To those of us who have been in extension work the question as to whether it is a legitimate function of a university is always amusing. There are some who consider extension work educational bootlegging. It is just as necessary for an engineering division as a sales department for a manufacturing concern and the relation is much the same. The proper combination of the two is hard to beat.

#### RECOMMENDATIONS

Recommendations, (1) that an allotment be made by the association for printing Engineering Experiment Station Record, and (2) urging a liberal attitude on the part of institutional authorities with regard to attendance of deans of engineering at conventions were adopted by the section and later approved by the Executive Committee (see p. 354).

#### COMMITTEE ON PATENTS

A committee was appointed by the chairman-elect consisting of Deans Potter, Richards, and Gladson, to report at the next annual meeting on a uniform practice concerning patents resulting from research in the engineering experiment stations.

#### ELECTION OF OFFICERS

Officers of the section for the ensuing year were elected as follows: Chairman, R. L. Sackett, Dean School of Engineering, Pennsylvania State College; secretary, C. R. Jones, Dean College of Engineering, University of West Virginia.

Adjourned.

## SECTION OF HOME ECONOMICS

TUESDAY MORNING, NOVEMBER 8, 1921

The meeting was called to order by the chairman of the section, Miss Mildred Weigley, University of Minnesota.

The Assistant Secretary of Agriculture, C. W. Pugsley, was introduced and discussed "The Place of Women in a Unified Extension Program," as follows:

### THE PLACE OF WOMEN IN A UNIFIED EXTENSION PROGRAM

By C. W. PUGSLEY, Assistant Secretary of Agriculture

I am very glad of this opportunity to address myself to the leaders of women on this very important subject. I am so thoroughly convinced of the necessity of closer cooperation on the part of extension workers, if women's work is to receive its just share of attention, that I am anxious to enlist the support of women themselves in the Department's plans to bring about this and other important results by the contemplated reorganization of the Washington Office of Extension Work.

If you will permit me to take a little time, I would like to sketch in a background to what I have to say. The history of agriculture and home economics extension work shows eras, as does the history of every other worthwhile progressive movement. First came the old fashioned agricultural fair where the biggest pumpkins and the heaviest oxen took the prizes without regard to quality. Women had a minor part in these fairs. The fairs were followed by the farmers' institutes where popular and entertaining lectures, mostly to men, but sometimes to women, were given to farm audiences. Next came the movable schools where technically trained experts with practical experience tarried for a few days in a community and conducted classes in agriculture and home economics, but mostly in agriculture. We are now in the era of special agents, where we have county or farm agents, home demonstration agents, and boys' and girls' club agents. Sometimes we have, in addition, special subject-matter agents assigned to or employed by counties for full time work.

Each era was an improvement over the one preceding it. Each succeeding one kept the good points of the last and added to them. The present is the best of the lot. That does not mean, however, that it is the last word in an agricultural extension plan. If I read the signs of the times aright, we are just now entering a new era of extension work. We will retain the agents but they will have a new conception of their duties.

I believe this because I have watched the development of extension work both from within and without since its very inception. I have taken part in it as a farmer, as a secretary of a county group, as a lecturer and instructor in its different phases, as an extension director, and during the last few years, have watched its development as an agricultural editor. I have had a growing feeling that agriculture as a whole, and the work of the women and the children in particular, have not been receiving justice under any of the systems which have been in vogue in the past. That is the reason I was forced to the conclusion some time ago that a change must come

The first stages of the change are upon us and we should get as clear an understanding of them as possible and lend our support to their proper consummation. Many extension directors, home demonstration agents, club workers, and leaders of farmers' organizations, hold the same view, and by letter and word are urging the Department to clear the way. I will tell you what some of these leaders are saying in my address before the general session (see p. 52).

If you will study the extension plan of organization in common use you will find that there are two or three separate administrative offices within the extension division of the Federal Department, the States, and the counties. If two, one deals with the work of the men and the other with the work of the women. If three, the third deals with the work of boys and girls. These divisions are along the lines of sex and age, an illogical division in this day, to say the least.

Separate administrative divisions of this sort call for a division of funds. Each administrative unit has its people working on projects, supervision, organization methods, and subject-matter. This in itself sets up a competitive system, making it necessary for the leader and the workers of each group to make every possible effort to maintain and increase the funds set aside for its special work. Often, altogether too often as a matter of fact, this competition works to the detriment of all. When a legislative committee or a board of county commissioners are confronted with two or three groups of people urging in every way the great need of appropriations for their separate lines of rural work, they frequently play one against the other, and the net result is less appropriation than could be secured by a united presentation.

I have seen this unfortunate result brought about all too often and entirely unconsciously by the advocates of the separate lines of extension work. When one becomes an advocate he frequently makes comparisons which have the effect of belittling the other lines of work closely associated with his, even though no such intention is in mind. A mere statement made by an enthusiastic advocate that his particular line of work is the most important is in itself belittling to the other lines. How much stronger is the appeal when those interested in all of the lines have agreed upon a program beforehand and all appear with their spokesman to urge the adoption of every part of a unified plan! You have the support then of every man and woman for every item on the program, instead of the support of the men for their items and the women for theirs.

When the items are presented and urged separately what is likely to be the attitude of the appropriating body? They are most likely to regard those items dealing with production and marketing as of more importance than those dealing with farm life. That has always been the history of appropriations and I suspect it always will be. When the Department of Agriculture was established it was logical and proper to make the first appropriations for the stimulation of food production. As the years went by the public became interested in distribution and appropriations were made for the study of marketing problems. It is only recently that pressure has been exerted to any large extent looking toward the proper expenditure of money in connection with improvements and economics in farm life, such as convenient farm homes, better preparation of food, better clothing, schools, community centers, and roads.



Whenever we find ourselves in a period of financial depression, such as we are experiencing just now, the first appropriations to be dropped are those believed to be uneconomic. That means the home and community work. On the whole, the program for the men is a program covering production and distribution. It is generally regarded as the money-making part of the extension program. It appeals to that practical type of legislative mind which asks how many dollars will be returned to a community for each dollar of appropriation. That trait of the human mind naturally becomes more dominant whenever it becomes necessary to guard carefully the public purse.

The general impression is that a great deal of the work with the women, and to some extent that with the boys and the girls, covers those necessary or pleasing activities which spend the money. I do not say that is true, I say that is the impression. If in our extension presentation we treat of these phases separately, the women's work is likely to suffer most. This is seen if we study the practical limitation of extension work in counties. Under the present system if a county is financially able to support but one agent, it is the agricultural agent. If two, a woman agent is added. If three, a junior agent appears. There are many counties so poor that they will never be able to support more than one agent. If that is so, should the work be done for men only?

A balanced agricultural policy resulting in a unified extension program must deal with economic agricultural production, the economic distribution of agricultural products, and the economic expenditure of the profits of these two transactions. These are the three legs of the tripod supporting the agriculture of the Nation. If any one of the three legs is not functioning properly the Nation suffers. Of what value is the money which is made by proper production and proper distribution unless it is properly spent? On the other hand, how can the money be properly spent unless it is made? The one is as essential as the other even though one must precede the other.

Our farm women are as truly producers as are the men. Many of them devote much time to work in the fields, gardens, and barnyards. I wish that agriculture were so profitable that it would not be necessary for them to devote so much time to these lines of work. Even if that were true, everything they do within the home in connection with the preparation of food and clothing is economically productive. More important still are those administrations which turn a house into a home and make life worthwhile. These things are as essential to a well rounded rural life as the mere act of producing the crops and getting them to market. If farm life must continuously deal with nothing but the problems of production and distribution few would be interested in devoting their lives to it. If our extension work dealt only with such problems I would soon lose my interest in it. These things are necessary but so is the creation of that atmosphere which makes life truly worthwhile. A unified extension program worked out by men and women on the farm getting together in a united meeting and agreeing to every point in the entire program will bring about this result, if we extension workers also get together. It can not be brought about in any other way.

Just at present the type of organization which exists in Washington and in many States makes this sort of thing rather difficult. The

leaders in the Washington office in charge of men's work, women's work, or boys' and girls' work, seldom confer. Their programs are not worked out around a common table at daily conferences. The workers in these groups are scarcely ever together, except as they chance to run across one another in the field. In the States we have a State leader for home demonstration work, one for county agent or agricultural work, and one, in most States, for boys' and girls' work. They each have their funds to administer and their workers to supervise. They often draw up their project without reference to the other work. They do not have daily, or weekly, or even monthly conferences. They frequently go to the extension directors with statements that the other leaders are not in sympathy with their work and are throwing obstacles in the way of its progress. I know because I have been there. I know also because other extension directors tell me. I know also because some home demonstration leaders within this room have told me how county agent leaders in their States have used methods in advancing county agent work to the great detriment of home demonstration work. I have heard boys' and girls' club leaders talk in exactly the same way.

But the evil of our present system does not stop with the Federal and State offices. It extends to the counties. If there is a man agent in the county he may do some home economics work and take some interest in the juniors but he does not have to unless he so desires. In most of the cases he confines his efforts to his own line of work. The woman worker does likewise, and so does the junior worker. One of the reasons is clear. They are administratively responsible to nobody, from the county clear up to the Federal Government, except those who are thinking in terms of their own specialized lines of work.

If the women expect their work to advance and grow rapidly they should insist that in every county some attention shall be given to women's work. That can only be done by the establishment of a unified extension program in which the projects for men's work, women's work, and boys' and girls' work are balanced and a fair share of attention given to production, distribution, and the social activities of the farm community. Such a plan will in no sense reduce the number of women agents. It will tend to increase them more rapidly, but more important than that, such a plan will increase the amount of women's work, and it is the only plan that will be just to all lines.

In times past I have been in sympathy with and have given my support to all movements to secure the vote for women. I have deplored the line of division which seemed to be established between men and women. Gradually society has been blotting out that line, so that now in this great free country of ours the line is practically obliterated. Women have the right to hold property, to practice law, to vote, serve in Congress, and to do everything else the man has a right to do. There are still some women, of course, who feel that women should live in a world unto themselves. These women would keep the division fences high and tight. Some would even go so far as to ask Congress for separate appropriations for men's and women's extension work. I think such an attitude is exceedingly unfortunate and is very illogical, and if persisted in, is certain to result in less work for the women. On the other hand, if the women insist that in every county in the United States, a fair amount of the extension

money and effort be expended for those things in which women are especially interested, but in which the entire family are likewise interested, and then that they in turn become really interested in the other lines of activity, we will see the dawning of the day when women's work will take its greatest advance step. I think we all need to get a bigger vision, one which extends beyond the things with which we are immediately concerned. We need, every one of us, to keep constantly before us a program planned for the entire family. Then we all need to work for the accomplishment of that program, each in his own niche to be sure, but each with a vision of the whole.

The administrative machinery for bringing about the important results we have just been discussing is a matter with which I am going to concern myself in my address in the general session of the convention tomorrow (see p. 52.) I am, therefore, not going into the details of the plan of the reorganization of the Federal Department at this time. I do want to say, however, that no matter what form the reorganization takes in the Washington office, the women's work will occupy a more important place than it has during the past. By that I mean that women will occupy a place in each of the proposed divisions. A woman will sit in when projects are being discussed and will be able to call the attention of those who are shaping the national agricultural extension policy and passing upon the projects to the place of women's work in these projects. I also mean that there will be women studying the best methods of creating the keenest interest on the part of farm women in carrying out the united project. These women will be studying the needs of women and their place in a balanced agricultural program and will be in position to render service to State and county workers in bringing about the results you women workers so much desire. There must also be among the extension specialists women who are giving their entire time to the technical problems of the household, such as dietetics, household economics, and household decoration, as well as specialists on clothing. The organization must be such that these women will come in constant contact with other people who are considering similar things. These are the evils we are attempting to correct so far as the Washington office is concerned.

Let me add that our plans of reorganization extend only to the Washington office. We are going to ask for no changes in the States or counties. We hope to clear the way, however, for State reorganization, if States so desire. I am led to believe that a number do. Our aim shall be to make our organization of such a nature that it will gear in to present or future plans of State extension organizations. In other words, we want to help the States get results in whatever way they think is the best for their peculiar conditions.

Dean A. R. Mann, New York State College of Agriculture, presented the following paper:

## RELATION OF THE EXTENSION SPECIALIST TO THE RESIDENT STAFF IN HOME ECONOMICS

BY A. R. MANN

In the first years of extension teaching as an activity of the land-grant colleges, the work was done by persons whose chief duty was the teaching of students and the conduct of investigations or experiments at the institution. The primary purpose of the meetings about the State was literally to extend the teachings of the college to the persons on farms and in farm homes who could not otherwise gain the benefits from direct contact with those who had special opportunities for studying, with the aid of science, the problems of the land. There was then no question of relationships, harmony in subject matter, keeping abreast, and the kindred problems which trouble administrators and teachers today. In most cases, the complete course from the experiment which revealed new facts, through the classroom and out to the farms, was embodied in a single individual. In theory, at least, this unity of discovery and impartation of knowledge approached the ideal. It added authority to resident and extension teaching. While it had obvious limitations, it also had advantages which are not entirely compensated for in the methods developed later. It is in the recovery of these advantages, to whatever degree may be possible, that the present-day problem in part lies.

### THE DIVISION OF LABOR

The division of labor occasioned by the segregation of work and workers into the three compartments of teaching, research, and extension, respectively, which generally characterize the land-grant institutions today, was an inevitable consequence of the growth of each of the three primary methods of agricultural progress by means of education. It was encouraged by legal enactments in various States, and it was immensely forwarded by the passage of the Federal Smith-Lever Act, with its large endowments which could be applied only to the maintenance of cooperative extension work in agriculture and home economics, necessitating the appointment or assignment of persons to engage only in non-resident teaching and demonstrations. On the whole, the change has unquestionably been highly beneficial to all three lines, and has been an important contributing cause to their more recent rapid advance. Increasing specialization is at once a means and a result of progress. But it can not always be defended as an unqualified advantage. Its complete realization has, in the present instance, involved sacrifices on the part of each of the three divisions of what is fundamentally one great task of increasing human knowledge in the broad fields of agriculture and home economics.

Without attempting to go into all the questions which this division of labor has created, we are here concerned only with those that affect the extension specialist in her relation to the resident division having to do with the same field of knowledge.

Basic to the whole problem of relationships is the consideration of the function of the specialist with reference to extending the teachings of the institution, or, as this has been interpreted to mean, the subject-matter as formulated and vouched for by the resident and research staffs. What is the implied responsibility, and what are the facts in the situation?

#### THE PURPOSE TO EXTEND THE TEACHING OF THE INSTITUTION

Historically, the development of agricultural education in the United States was, in general terms, first, the organization of institutions for teaching agriculture and the mechanic arts; secondly, the establishment of experiment stations for the acquisition of knowledge; and thirdly, provision for carrying the knowledge supposedly accumulated at the institutions to persons resident in the localities throughout the States. The colleges and stations had been at work for some time, and had made really notable progress, before a widespread demand arose that their accumulations of knowledge should be carried to the people by more speedy and direct means than the slow infiltration of agricultural college students and the uninspiring perusal of bulletins which were received with a measure of distrust. The discussions preceding and attending the passage of the Smith-Lever Act dealt largely with the consideration that the land-grant colleges and the United States Department of Agriculture had made large advances in knowledge which had not yet found their way to the rank and file of American farmers, who would undoubtedly benefit by the utilization of much of it in their practice. The specific demand was for a means of "extending" the findings of college and station to the people beyond their immediate confines. The purpose of the enactment of the Smith-Lever Act itself is stated in its opening sentence to be "to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage the applications of the same."

How could it have been otherwise? The agricultural college and the experiment station were the foremost and almost the only agencies engaged in discovering new facts with reference to plant and animal behavior and agricultural production, and the expanding body of useful knowledge was peculiarly in their possession. The purpose was to get their knowledge out to the people. It was assumed to be the province of the resident and research staffs to accumulate and organize the knowledge, and of the new agencies to carry it out. The organization of the extension work must be such as to accomplish this purpose. This means that there must be a close union, not an occasional conference nor merely a cordial attitude, between the extension specialists and the resident teachers and investigators.

#### THE NEED FOR THE SPECIALIST IN THE ORGANIZATION OF EXTENSION SERVICE

The facts in the situation reveal that in a few places the need for extension specialists is not fully accepted, the assumption being that the county agents or home demonstration agents can fully meet the needs. This indicates an immature development of extension service. The agents in the counties stand as "first aids," and can take care of most of the routine or more simple and elementary matters. For the most part their equipment consists of practical experience, and seldom more than an undergraduate course in home economics. Their time is fully occupied in doing things. Progress in home economics subject matter is going forward somewhat rapidly, and at best these agents can visit the points of largest accumulation only infrequently and for brief periods. For the most part they render excellent service, but they are generalists, not specialists. Farmers and farm women are increasingly needing and in many places

demanding the aid of specialists. Instead of eliminating the specialist, the more successful the agent the greater demand for specialists she will create. She can not long maintain a strong, progressive work unaided by specialists. In New York State, for example, there are 31 county home demonstration agents, and they will average well in ability with similar agents in other States. A few days ago a committee of farm women from all parts of the State called on the dean of the State college to urge as strongly as they could the putting on of more home economics subject-matter specialists. They went so far as to say that unless the home demonstration agents could have the support of a larger number of specialists, the whole enterprise would be jeopardized. We must have the specialists; and the specialist force must be developed coordinately with the field organization. In the speaker's judgment, the appointment of specialists should precede the development of the county home demonstration agent system.

#### THE STATUS OF THE EXTENSION SPECIALIST

It is no reflection on the extension specialist to assert that she must depend in an important degree on the resident teaching and research divisions for the means of keeping informed on current progress in the field of knowledge. The persons in these divisions dwell at the point of accumulation, and the energies of the institution are devoted to providing them with the time, facilities, libraries, and equipments to enable them to make original contributions to knowledge and to place immediately at their disposal the most reliable reports of progress made elsewhere. A first consideration of every college and university official is to make these opportunities for the highest scholarship and scientific attainment as ample and complete and stimulating as circumstances will allow. The resident staff lives in this environment.

On the other hand, extension teaching, by its very nature, carries one away from these sources, and places the specialist in an atmosphere where empirical knowledge predominates. The inconveniences of constant traveling do not encourage or admit of the best habits of study, nor do the demands of the field usually allow adequate time for the specialist to contemplate current progress in the subject. The opportunities for original research on the part of the individual are practically non-existent; and the tendency of the Federal authorities to urge that persons engaged in the cooperative extension service shall give full and undivided attention to extension, the rigid insistence that persons paid from the Lever funds shall never, on those funds, engage in any investigations whatsoever, even in simple tests or trials which have for their purpose checking or verifying supposed facts to the satisfaction of the specialist prior to their utilization for general demonstrations, and the further insistence that the specialists can, as Smith-Lever employees, demonstrate only what is assumed—not always a same assumption—to have reached already the stage of settled fact at the hands of other workers, establish the ideal that extension specialists shall be avowedly second-hand teachers, supposedly qualified to evaluate accurately scientific researches, but without the opportunity to engage in experiment or research by which alone one can retain permanently the best mental equipment for making trustworthily such evaluations. The resident teacher, surrounded as she is with every incentive to growth, seldom, if ever, attains a foremost place if she engages in no

investigations on her own account. The extension specialist is, in the nature of the case, doubly handicapped. In the long run this is likely to prove to be the most embarrassing problem in the whole extension service, because of the difficulty of combining the two types of effort.

Observation indicates that the turnover in extension specialists is unduly rapid. A few days ago, the dean of one of the largest and best-recognized agricultural colleges wrote me that some years ago his institution had made arrangements whereby the specialists should be set free one term every four years in order to devote the time, on salary, to professional improvement; and that thus far only two specialists had been able to avail themselves of the privilege, as none of the others had been or remained at the college long enough to qualify. In my own experience, the highest-grade persons whom we seek to engage as specialists have an increasing tendency to urge that they do not care to accept appointment unless permitted to do some resident teaching or research, or are assured of adequate periods for study. We are very rapidly passing from the time when the most valuable specialists will be content to engage continuously in field work, or when the advancing demands of farmers and farm women can be satisfied by persons who allow themselves to be removed from frequent, direct, and intimate associations with the sources of expanding knowledge. The problem becomes a triplicate one of keeping the specialist abreast, keeping them content in their important work so that their tenure of service will be long, and enabling them to meet adequately the constantly enlarging horizon of farmers and farm women.

All this is not to imply that the specialist does not have resources in herself, and must not employ as fully as she can the same means of continued personal development as are open to the resident staff in the libraries and literature and conference. Nor does it overlook the invaluable contributions of varied field experiences and knowledge of the best practices of good housekeepers, to one's equipment and accuracy. But, assuming these conditions, a problem still remains.

I desire not to be misunderstood. Every investigator and every resident teacher must depend to a very large degree on the findings of other workers. Knowledge is accumulative through the ages, and the best teachers can contribute but a mite to the total that they must use. The peculiar advantage of the investigator and of the resident teacher lies in her opportunities to exercise herself in scientific methods, and continuously to assemble, correlate, and organize for her use the results of scientific effort elsewhere in her field. It is this constant practice that keep her abreast of progress, if she keeps abreast. The problem is how to create situations in which the extension specialist, whose privileges of public service are equally as high as those of teacher and investigator, shall be enabled to keep her mental equipment equally alert and responsive to every important advance in her section of the field.

#### THE QUALIFICATIONS OF THE INDIVIDUAL

The first condition is to have the right kind of specialist. The fundamental training and the study habits and characteristics of the individual are the best guarantee as to whether she will keep in touch with the progress of knowledge in her field. No one should be appointed as an

extension specialist who is not in every way qualified for appointment to the college faculty. The appointee should be of such training and qualifications that she can at any time be transferred to college teaching without loss or embarrassment. No form of organization or other expedient will compensate for lack of zeal and capacity for technical and professional development on the part of the specialist herself. The greater and more sustained the zeal, the less will be the problem, whatever the form of organization.

#### THE FORM OF ORGANIZATION

The form of organization is, however, very important. Taking the country as a whole, we find (1) institutions where teaching, research, and extension are all developed in a single department of home economics under a single administrative head; (2) institutions where the extension specialists are organized wholly apart from and coordinate with the resident division, the two, however, having no official relationship; (3) institutions where there exists an extension organization in home economics, but no resident teaching nor research work in the subject, the resident work being established, if at all, at a separate State institution. What is to be done as regards the specialists, under these various circumstances? Let us consider these situations in reverse order:

(1) We have the situation in which there exists at the land-grant college only an extension organization in home economics, with no resident work whatever at the same institution. I say without qualification that under such circumstances the efforts should be unremitting to obtain the means for establishing a full-fledged resident department of home economics at the institution. If the land-grant colleges are to maintain extension in home economics, as the Smith-Lever Act charges them to do, the prerequisite to success is the establishment in the colleges of strong resident departments. Extension can not remain vital where there is nothing to extend beyond the original equipment of the extension specialists.

(2) Where the extension service is organized wholly independently of the resident division in the same institution, with no organic relation other than that they are both parts of the same college, this condition would seem to find its explanation in one of four causes:

(a) The first cause is the circumstance of origin. In a few cases it is undoubtedly true that the separation is due to the fact that the divisions were organized at separate times and under separate administrations, and the traditions of autonomy and independence, and coordinate rank and recognition, are difficult to overcome. The pride of development and accomplishment is strong. Having always been separate, there is not yet a full recognition of the gains that would follow some form of organic relationship. The work is new and the real tests have not yet arrived. In these earlier years the divisions may have done well separately. In the long pull, they will do better with an intimate relationship. The circumstance of independent origin is not of itself a valid reason for retaining organic separation.

(b) A second cause, which has something to support it, is administrative convenience in having the specialists organized about the office of the director of extension, so that program making and field assignments



may be more readily handled. This arrangement is simpler to administer. However, I am firmly of the opinion that, in the long run, problems of administrative convenience will be less trying than those of the maintenance of professional standing. To allow administrative convenience to determine the organization is to make concession to mechanics of operation at the expense of sustained qualifications for the chief business in hand, which is teaching a subject matter that is constantly changing and advancing. In institutions where the specialists are members of the subject-matter department and are housed with that department, as in my own, the loss of administrative convenience is scarcely apparent. I question whether this convenience is as important as it has sometimes been regarded. The unit of organization should be the subject matter, not the machinery for getting it out.

(c) A third cause for the separation, which is sometimes continued where deliberate judgment dictates that it really should be otherwise, is fear on the part of the extension director and the extension specialists that the specialists will be so dominated by the resident staff or the head of the resident department that the extension service will actually suffer. There have been occasions for this fear. Such a situation is inimical to good extension work. It will defeat good extension service. While I subscribe fully to the proposition that the specialist should be organically identified with the resident staff as a prime requisite to keeping alive to progress, I have no patience with any system that subordinates the specialist to the resident staff or permits of her being subjected in any degree to dictation by the latter. Where reason and presentation of evidence fail, dictation will accomplish no good purpose. The specialist must have, and should eagerly seek, the aid of the resident staff in planning her work and formulating subject matter. She lays herself open to real danger of error in teaching if she does not freely consult the resident workers in the same field. But if, in the interest of maintaining either superior position or harmony in subject-matter, dictation is resorted to, the arrangement fails. Improperly qualified persons, whether in the extension or in the resident division, should be removed. A host of evils will result from subordination of specialists or attempts to make them feel that they are of a lesser order. The end to be striven for constantly is to make them co-equal in every respect with the members of the resident staff, and held to be coordinate with them, individual for individual, under the head of the department. A fundamental consideration is equality of recognition and standing, and the assumption of equivalent general capacities.

(d) A fourth cause, which has perhaps had some bearing, is fear that the head of the resident division will desire to exercise the full power of selection of extension specialists without a sufficient appreciation of the particular qualities that make for success in extension teaching. In defending this position, it must not be overlooked that selection by the director of extension alone is open to fully as great danger from the standpoint of technical qualifications. The specialist must possess both sets of qualifications. The only protection from danger on either hand is an arrangement that amounts to joint selection by the head of the department and the director of extension. This arrangement is entirely feasible and easy of operation. Because of my own feeling that the technical qualifications are the more difficult to determine, I should prefer to have the nomination

originate with the head of the home economics department but be invalid until the director of extension is satisfied, by personal interview or otherwise, that the nominee promises to be acceptable as an extension worker.

(3) In the best organization, teaching, research, and extension in the given field of knowledge will all be organized at the same institution in a single department, and the teaching and research will have at least coordinate development with the extension; preferably greater development, so as to keep constantly ahead of the demands in practice. The resident department will be responsible for subject matter, the programs will be matters of joint conference, and the field assignments will be largely or entirely in the hands of the extension service.

While practices differ, I am of the opinion that the organization should provide that the extension specialists shall office with, as well as be members of, the resident divisions or departments having to do with the particular fields in which the specialists are engaged. This has been generally accepted in agriculture. In home economics this intimate relation to the resident staff is particularly important, because the body of knowledge is more limited and less definitely formulated than it is in the case of agriculture. With the serious lack of provision for research in home economics at most institutions, there is peculiar need for the closest relations with the resident teaching staff, which on its own part must exhaust every resource for the discovery of scientific evidence to shape or sustain its teachings.

We must not omit another important reason for establishing the most intimate relations between resident and extension workers, namely, in order that the resident staff may know the viewpoint of the field and keep in touch with practical and public affairs, and that the specialist may always retain the viewpoint and the poise of the institution, careful as to facts and sensitive to the limitations of her function as a teacher, so as not to become a mere advocate of class or partisan views or be carried away by temporary moods or prejudices of those with whom she must constantly deal. Extension service everywhere has suffered from occasional, if not frequent, lapses from the standards that should always control educational workers.

#### SPECIAL PROVISIONS

The problem is not fully solved, however, when well trained specialists have been engaged and have been established in an organization that provides the most intimate official relations with the resident teaching and research staffs. This condition obtains at some of our institutions and the situation is not thereby fully met. The pressing demands of the field operate to defeat the advantages which the organization contemplates unless conscious provision is made to promote frequent conference among the workers, to bring them into touch with whatever investigations may be in progress, and to allow periods for uninterrupted study and organization of new material. This conscious provision at the institutions takes many forms: individual conference with the particular resident worker best able to give help on the problem in hand; stated weekly or monthly conferences, in which a definite aim is to discuss the problems that have arisen in extension, in resident teaching, and in research, and to review the latest acquisitions of knowledge; keeping specialists free from field

assignments for certain days of the week or certain weeks in the month, or for longer periods, in the hope that they will find time to contemplate the recent contributions; granting temporary leaves of absence, with or without salary, for purposes of study or investigation; arrangements to carry a limited amount of teaching from time to time, or provision for the prosecution of limited projects in research which admit of intermittent attention; financing specialists to attend summer schools; encouraging specialists to register for advanced degrees; attaching specialists to departmental seminars; identification of specialists with scientific societies within the institution; preparation of material for specialists by the resident staff; special arrangements with members of the resident staff to test problems encountered by the field worker; and the granting of sabbatic leaves of absence, with salary, for professional improvement. In the long run, intimate association with the resident workers, and special provisions for constant technical advancement, will be found conditions to permanent success and satisfaction in the work.

#### THE CONTRIBUTION OF THE SPECIALIST TO RESIDENT TEACHING AND RESEARCH

It would be quite unfair to omit mention of the reverse aspect of the question, namely, the benefits that accrue to the resident teaching and research officers from their association with a good extension worker. It is all too common a condition to accept as settled fact that which intimate and wide experience subsequently shows to be an error. The classroom and the scientific laboratory are the primary means of progress in many respects, but they are not always infallible, and in frequent cases they do not afford the check that is possible only by field trial under normal circumstances and under widely varying conditions. The validity of many apparent truths is not fully established until they have been tested by actual practice in a large way. Sometimes this can be done by the investigator or the teacher, and sometimes it can not. When a new method or practice is committed to the extension worker for demonstration and application, it is likely to come up against the final and severest test as to its soundness. The specialist thus frequently makes important contributions both to knowledge and to practice.

The specialist, if she is observant, will frequently aid the station by discovering the need for experimental verification of much that has long been accepted in practice as the right thing to do. How many of the things we do today with complete assurance will be found in time to be the wrong, or at least not the best, things to do! Has not the progress of science from the beginning been just that—the upsetting of what in our ignorance or dim light we thought was right? The specialist is at the most sensitive point of contact to discover practices that need verification or problems that need illumination.

The specialist makes her contribution both to teaching and to research. Some of the most helpful things introduced into the resident courses are the result of suggestions brought in from the field. But the contributions to teaching methods are probably as great as, if not greater than, the contributions to subject matter. The extent and value of this influence has not been fully recognized or capitalized. Resident teaching has usually proceeded from the abstract to the concrete; from the statement of the principle to its elucidation by details of practice. The extension teacher

proceeds from the concrete to the fundamental facts that lie back of it; from the practice to the principles that explain and justify the practice. The resident teacher may be chiefly concerned with theories that account for phenomena. The extension worker deals with problems requiring solution. The classroom audience, largely inexperienced and, therefore, lacking an essential to ripe judgment, will remain and receive with apparent respect and usually without challenge what the teacher sets forth. The farm audience, whose equipment is chiefly experience, passes judgment, gives voice to challenges, and goes home if the teaching does not interest and convince. The concern of the farm audience is chiefly with the problem, and in less degree with the principles or the theories affecting it.

One specialist describes the extension method as more psychological than logical, and the resident method as the reverse. The extension method is and must be both. The extension specialist must develop methods which guarantee that her lesson will be fully comprehended by her hearers and so clearly understood that they can at once utilize it as a guide to practice. The teaching methods thus developed with mature but less trained minds, have certain values for the classroom and the immature but more highly trained minds; and the resident teacher who has intimate contact with a good extension specialist, consciously or unconsciously is likely to modify her classroom procedure in some respects by the incorporation of methods which the specialist has set into her mind. If the resident staff makes important contributions to subject matter, the extension staff is likely to make important contributions to teaching methods. If, by exchange, harmony in subject matter is promoted, each correcting the other in certain matters, so, by exchange, reciprocal gains in methods will be registered.

#### THE FUTURE OF THE EXTENSION SPECIALIST

A phase of the question which will bear no overlooking is, what is to be the future of the extension specialist? It is too early to give an exact answer to this question, but the indications are strong that the trend will be steadily toward a demand for persons who have superior technical and scientific training and who will stand very close to the research in the field. There will always be need for a certain amount of elementary work in the extension field; but as farmers and farm women progress, as they are progressing, and as the vocational schools do their work under the Smith-Hughes Act, the requirements will become increasingly exacting. As we have largely emerged from the institute type of work, so are we beginning in many places to pass out of the second stage of imparting information and giving demonstrations concerning routine operations. What was once regarded as advanced knowledge has now become common knowledge for great numbers of farmers and farm women in every State, and they are pressing for help in new and more difficult ranges. Farmers and their wives are crowding the borders of knowledge in agriculture and home economics at many points. In every State, undoubtedly, there are even now, groups which prefer to hear directly from the station worker and which receive his message understandingly and sympathetically. To an ever-increasing degree will the established knowledge of general practices of the present day be communicated by the county agricultural and home demonstration agents, the teachers of agriculture in the high schools, and

other workers resident in the localities. That institution is wise and forward-looking which is today seeking for appointment as extension specialists, persons not only with practical sense but also with advanced training or station experience or its equivalent, and with highly developed habits of study. The specialist of the future will be in a larger and truer sense a specialist, to aid and advise on the more difficult problems. She will be less a second-hand teacher. She will demand every opportunity and facility to keep abreast of progress in her field, and, if I mistake not, will require arrangements that will make possible her own independent examination and solution of some of the problems that arise in her work. This means either that she will be less exclusively an extension specialist, or that she will have much more time for personal improvement than the present arrangements afford.

In order to develop or to engage and hold the type of persons that will be increasingly needed as the work matures, there are demanded the fullest comradeship, equality of recognition, mutual respect, equal opportunities for study, and intimate, cordial association, between the extension specialists and the members of the resident staff.

#### DISCUSSION OF DEAN MANN'S PAPER

MISS JULIET LITA BANE, University of Illinois. Since home economics extension work in its present proportions is new to all of us, any statement regarding relationships must be largely a matter of personal opinion. It would have been very comforting to have been able to turn to the United States Census or to the account of some research work in order to arrive at conclusions; however, since that was impossible, what I shall have to say will necessarily be based upon personal experience and observation.

I have been somewhat ambitious in my plans for this discussion by attempting to discuss the whole matter of relationships, both as they concern the specialists and the State leader. However, it seems to me that there is something to be gained from discussing the whole problem since the policies in various institutions appear to differ so widely.

Before this new and rapidly developing piece of work began to call for leadership, the head of the resident department had seemed to have a position which required most of her time and attention. To have the field of home economics extension grow up in a few years, with from fifteen to thirty or more persons employed in the work and several thousand women in the State supporting the work, presents a very real problem. With the work scattered about over the State, a very considerable amount of field work is necessary, and it would seem that for the head of the department to devote enough time to this work, to see to it that it is effectively administered, would require more time than she could give without sacrificing her resident work at some points. However, the head of the department should be a valuable aid to extension work. It would seem to me that, although it would not be possible for her to supervise in any detailed way the home economics extension work, it would be to the advantage of both the extension work and the resident work to have an official connection established between the State leader of extension work and the head of the department. Just what this relationship would be would depend, it seems to me, upon the local conditions and personnel. The possibility of coopera-

tion between the head of the department and the State leader has been suggested, but again that does not seem to me to be a connection sufficiently well defined to allow of the State leader's claiming the help which she might receive from the head of the department.

Up to the present time the matter of method has loomed rather large and it is probable that until some definite and effective extension methods have been established, the question of method will continue to occupy a fairly prominent place. While it is never wise to allow the machinery for getting the work done to overshadow the work itself, we must realize that at the present time the machinery is very important.

It has been thought wise by some to have the specialists attached to the resident staff with no official relationship to the State leader. While subject matter is of paramount importance, it is of little use unless there is some means of delivering it to the persons who want it. For this reason it would seem that there should be some relationship between the State leader and the subject-matter specialists, and that this relationship should be closer than the relationship between specialists and the subject-matter department. In other words, the specialists should reach the resident staff through their State leader and the head of the department rather than through the head of their subject-matter division; at least until such time as it is not so necessary that the specialists shall give help, both in method and subject matter. Since the State leader is having direct contact with the organization and has much to do with the organization policies, it would seem that she could more easily direct the work of the specialists in the organized counties as well as in the counties not having definite home bureau organizations in order that there may be continuity of responsibility and administration.

I would not underestimate the importance of having the specialists in close touch with the persons on the resident staff who are in the same fields of work. The extension workers do not have time for research work and it is important that they keep in touch with the latest findings of research workers. Consequently, definite plans should be made to allow specialists to keep in touch with the work as conducted in their own institutions. As the extension workers need the resident department in order to keep in touch with new subject matter and methods, so the resident department needs the extension service to keep them in vital touch with the problems of home making as they are observed by the extension workers.

It happens that at the University of Illinois our specialists are urged to visit classes and a plan is being carried out by which at least twice each month all the persons representing a definite branch of home economics work meet together to discuss common problems and to compile a bibliography dealing with their particular subject. This has seemed to us to solve the problem of keeping the specialists in touch with what is being done in their subject-matter fields by members of the resident staff. We have found that being housed in the same building with the home economics department has been profitable to us as extension workers and we believe it has been worthwhile also to the resident teaching staff.

In the States where the group of extension workers has worked independently of the resident home economics department, such a plan as I have suggested might seem to be working a hardship on the extension

worker. I believe that this is more apparent than real, however. It would mean for the State leader something of a loss of prestige and probably a salary not so large as is paid where she carries the entire responsibility for the extension work. In the latter case I believe the salary tends to approximate that of the head of the department. However, for the sake of a unified, well coordinated program of home economics education for any given State, it is my opinion that there should be a definite official relationship between the resident department and the extension staff. There are many States where such programs could not be worked out successfully at the present time. For example, in States with strong extension divisions and small college departments with heads who are fairly inexperienced, such a relationship could probably not be worked out satisfactorily. However, it is our hope that home economics shall at some time represent one of the important departments of all of our land-grant colleges. It does not seem to me too much to hope that in time we shall be able to find women capable of acting as heads of resident departments who can also take over the responsibility of being advisers and intelligent counsellors, and perhaps general directors for the home economics extension workers.

ALFRED VIVIAN, Ohio State University. Dean Mann has expressed all the points I have in mind. My excuse for being here is long contact with extension work, including ten years of experience before the passage of the Smith-Lever Act. I fear two things: First, that people teaching in the same or correlated lines may not agree in their public statements. Formerly, it was not uncommon for college professors to dispute statements made by their associates; e. g., a soil specialist would make statements conflicting with those of the college teacher on soils. This condition is less in evidence today. Second, there is a tendency on the part of all teachers to "slump." Being well prepared, they become complacent and fail to do their best work. To guard against these weaknesses, we must first, agree upon public utterances; second, stimulate extension people to keep abreast of the times. Granting the right personnel, the most effective organization is to place the head of the department in general charge, having an assistant in each line. This group constitutes a cabinet in which final judgment is passed by the head of the department and the routine is in the hands of the individual groups. The head of the department must have time to reflect and to develop plans, and should not be burdened with details. It is easier to carry out this plan when the department of home economics is in the college of agriculture. The personnel of the extension force should in every way equal that of the teaching force. They should have full academic standing and regular place in the faculty.

In Ohio, we have a rule that the individual shall get the salary he merits. He is not paid according to his rank or period of service. Extension workers must have opportunity for improvement, and the same privileges and opportunities for study should be extended to them that are given to resident teachers. To accomplish this, it may be necessary to transfer them temporarily at times from the Smith-Lever fund. It is not possible to insist that the same type of organization be used in every State.

TUESDAY AFTERNOON, NOVEMBER 8, 1921

## STANDARDS FOR RESEARCH IN HOME ECONOMICS

The chairman introduced E. D. Ball, Director of Scientific Work of the United States Department of Agriculture, who said: Agriculture has had thirty-three years' development, and home economics ought to use all of its experience and profit by its disasters and mistakes. Agricultural research is not yet considered comparable with that of older allied sciences. There was no gain in the teaching of agriculture until the experiment stations were founded and a body of knowledge collected. This is not yet adequate. Agriculture is an art around which is associated a great number of sciences. The greatest development of agriculture has not been within the agricultural departments, but in the allied sciences of chemistry, physics, botany, zoology, entomology, and bacteriology. The development of research in these allied sciences and its application to agriculture has laid the foundation of agricultural instruction. The home economics field is not a department, but a division. It involves such sciences as chemistry in application to nutrition and dietetics, botany, physiology, bacteriology, physics, and genetics. In home management it reaches into fields of economics and sociology. Genetics is of the greatest possible importance and almost wholly undeveloped. It should be considered in a home economics course. Just as the organization of courses must be made with a clear recognition of the field, so home economics research must take in all related sciences.

C. F. Langworthy, Office of Home Economics, States Relations Service, United States Department of Agriculture, presented the following paper:

## SOME STANDARDS FOR RESEARCH IN HOME ECONOMICS

BY C. F. LANGWORTHY

There is no doubt very general familiarity with the standards to which research work must conform if it is to be worthy of the name. Nevertheless, it is not without profit to call them to mind now and then, just as we find it desirable to inventory our material possessions, and in doing the one or the other, it is not unlikely that we will recall something which we may have for the time being forgotten, or which it is a pleasure to come upon once more.

The term research is used rather loosely to cover a great variety of work which may range all the way from the study of printed texts to elaborate laboratory studies, but which in scientific work usually involves more or less extended laboratory study. In any case the intention is to increase knowledge by adding deductions not previously made or facts hitherto unknown.

In the field of home economics, the earlier and more extensive research has been concerned with problems of food and nutrition. Work of this sort was organized and, to a considerable extent, standardized by Professor W. O. Atwater and his associates in extensive investigations originally started for the Smithsonian Institution and the Connecticut Agricultural Experiment Station and later carried on under the auspices of the United States Department of Agriculture, much of the work being done at Wesleyan University, where he was for many years a professor of chemistry.



The later and brilliant development of research work in food and nutrition for which so many men and women deserve credit is truly remarkable.

There is great need for similar work in such home economics subjects as textiles and clothing; household materials and equipment and their uses; and not least in household management. In this connection it is worth noting that the respiration calorimeter, originally designed by Atwater and Rosa to study problems of human nutrition, offers one of the few exact methods of broad application for the study of many problems as diverse as the energy expended in the performance of household tasks, the protective power of clothing, the character and extent of changes which fruits and vegetables undergo after harvesting, and factors which influence the successful incubation of hens' eggs.

Fittig, one of the great chemists of the late nineteenth century, was accustomed to emphasize in his lectures the importance of remembering that many things which we accept almost without thought as proved—the atomic theory, for instance—are after all theories or working hypotheses. Time has proved that the example he cited was a good one. In work we must take the theory into account but we must not forget that it is theory. Furthermore, the chemist quoted said that our theories may change, but reliable, carefully recorded experimental data will retain their value for purposes of discussion. There is food for thought for the research worker in this.

Research work to be of value must be planned around some theory or idea or problem. There are a fortunate few whose accomplishment seems to be the result of an accidental discovery, but even in such cases it will usually be found that behind the discovery was research work planned with some theory or working hypothesis as a starting point and to serve as a guide. But it is still a guide only, for the investigator's goal is a generalization or a truth, based on his work. He does not care whether his conclusion supports the theory with which he began or whether it proves the exact opposite, for he seeks the truth. In this is found the difference between the true investigator and the man who is sometimes thus styled but who has no just claim to the title because his object is to prove a theory which he has already accepted. Such a worker may be self-deceived, and may be so poorly trained that he does not realize his mental attitude. Be that as it may, many of the popular and widespread misconceptions of matters pertaining to food and nutrition are ascribable to this very type of worker and to such so-called research work.

The investigator needs good, fundamental training, familiarity with the subjects which pertain to the problems he wishes to study, and a trained mind which will enable him to make logical deductions; and it will be greatly to his advantage to have had such a grounding in the principles of literary expression and the use of his mother tongue that he can state his proposition clearly, report his observations accurately, and present his conclusions concisely and forcefully.

Patience, perseverance, ingenuity, exactness, and neatness are all qualities which the investigator should possess. A well-known teacher and research worker was accustomed to say that if a student did not keep his laboratory desk in such order that he could eat his lunch on it, he was not a good worker, believing, no doubt, that indifference to such details does not indicate an orderly mind.

Of great importance, also, are a willingness to work long hours, a love for the literature of one's subject, and a knowledge of how to find and use literary material relating to the subject in which one is interested.

The better the training, the wider the outlook, and the greater the zeal in scientific research, as in other things, the greater the chances of ultimate success.

Important as these qualifications are, it is also true that no matter how great the skill with which the work is carried on and reported, nothing outweighs in value the absolute mental uprightness which draws deductions from the fullest available evidence and which does not hesitate to modify a conclusion as soon as additional reliable evidence warrants it. Fortunate is the investigator who achieves results which find application in every day life and who makes the work available for the common good.

Laboratory research is usually costly because of the varied equipment required and the time which must be spent on details, and one must not lose courage when results are not forthcoming or when equipment has to be discarded or modified; it often happens that work must be carried on for months or even years, and that experiments must be duplicated many times before generalizations are reached which can be considered sound and of wide application.

The investigator often finds when his work is completed that he has only negative results to report. Such conclusions may seem less interesting but they are often of great value, and the investigator should not be discouraged because his findings may be the basis of later success.

Many chemical laboratories and bacteriological laboratories and one or two devoted to the study of food problems are fortunate in having the organization and endowment which permit research work under almost ideal conditions, but this is not yet the case with laboratories where research in many and varied home economics problems is carried on. Perhaps a reason is that home economics has been too recently organized as a separate subject to make the impression on the public mind which its importance certainly justifies. Grateful as we all are for the opportunities which come to us in university and Government laboratories, we can not but hope that in the future the investigators who study the problems of the home may have the same generous support which now is given to the medical investigator and the investigator whose work finds application in technical processes, the value of which is easily appreciated by reason of its immediate bearing on social welfare, industry, and business. Because the funds available for work in home economics taken altogether are comparatively limited, it is especially important that close cooperation should be organized so that duplication of effort may be avoided and a maximum amount of work accomplished. Then, too, there is reason to hope for more generous conditions in the not-too-distant future.

If a strict interpretation is given to the word "research," much of that to which we now give the name would hardly pass, because it is scarcely more than experimenting along reasonably familiar lines, yet simple experimenting, or work which can hardly be designated as more than "cutting and trying," may prove very useful if it is intelligently related to a well thought out cooperative plan.

In making comparative tests for experimental purposes, a fundamental principle is that only one variable should be introduced at a time. This is

often a difficult matter, particularly in the study of cookery problems, which are so often complex in their nature. It is easy enough to obtain good results so far as table quality is concerned, but this is not enough. Sound methods must be devised and made acceptable and attractive for every day use. Application of results is almost as difficult as accumulating reliable experimental data.

That we may take pride in research work pertaining to home economics, let us look back to the pioneers in American research work on problems of interest to the student of food and nutrition.

American research work in food and nutrition, so far as we know, began in 1802, when John Richardson Young, who graduated in 1799 from Princeton University, then the "College of New Jersey," entered the University of Pennsylvania and began the investigations which resulted in the thesis, "An Experimental Inquiry into the Principles of Nutrition and the Digestive Process," which was submitted for the degree of doctor of medicine.

Foods of various sorts were introduced into the stomach of bullfrogs and withdrawn at intervals for examination and similar experiments were also made with snakes. Young and a friend of his were themselves subjects of experiments in which food was ejected after an interval and examined. Young's experiments and observations were carefully considered and interesting deductions were drawn which were a real contribution to existing knowledge.

Among other things, Young's work did away with earlier theories, such as the theory of innate heat and vital spirits as essential factors in the act of digestion. To quote from his biographer, Dr. Kelly,<sup>1</sup> Young showed that digestion was affected by an acid which he attempted to analyze and concluded wrongly was phosphoric acid. He secured pure gastric juice and experimented with it *in vitro* and showed that the acid gastric juice checked putrefaction.

With every prospect for a brilliant and successful career, Dr. Young died about a year after the publication of this thesis, and is buried at his birthplace and family home, Hagerstown, Maryland.

Another great American pioneer in research work was William Beaumont, who was born in 1785, about two years after Young, and who was also a doctor of medicine and a surgeon in the United States Army, as well.

In 1822, when stationed in Michigan Territory, as it then was, Beaumont had a patient, Alexis St. Martin, a young French Canadian, who had been accidentally wounded in the stomach by the discharge of a musket. After nearly two years this wound had healed in such a way that an opening was left in the stomach near the margin of which "a small fold or doubling of the coats of the stomach," had formed. This fold closed the orifice in such a way that the stomach contents did not escape, but it could be easily pushed aside so that the gastric contents could be removed.

In May, 1825, Dr. Beaumont with St. Martin as a subject, began his remarkable series of "experiments and observations on the gastric contents and the physiology of digestion," the volume which reported this work being published in Plattsburg, New York, in 1833.

<sup>1</sup>"John R. Young, Pioneer American Physiologist," by Howard A. Kelly. (Johns Hopkins Hospital Bul., Vol. 29, No. 330, 1918, pages 186-191.)

Dr. Beaumont's work is remarkable for his closeness of observation, his freedom from the influence of preconceived theories, his exact record of his findings, and the ingenuity with which he took fullest advantage of his remarkable opportunity.

These two pioneers, Young and Beaumont, afford splendid examples of the ideals which should govern research work. They made an opportunity for work or seized the opportunity when it came; they worked carefully and conscientiously; they recorded their observations in sufficient detail and in clear and concise manner; they sought the truth unhindered by preconceived notions; and they left records which are valuable today for the facts they contain as well as for their historical interest.

This is particularly true in the case of Beaumont. His tables of the length of time the food remained in the stomach are still quoted, and it is interesting to note that he was more clear-sighted than many of the men who have made use of his work, for he reports on the length of time the food remains in the stomach and other such matters, and discusses his observations on the basis of gastric digestion, while his work has been too often quoted as if it referred to the whole process of digestion.

With such sound beginnings in American research, there should be no work but the best in the study of food problems and others which pertain to home economics.

Dr. Minna C. Denton, of the Office of Home Economics, discussed the subject as follows:

#### WHAT CAN WE DO TO PROMOTE THE ESTABLISHMENT OF HIGH STANDARDS IN RESEARCH?

BY MINNA C. DENTON

Home economics research as such has been undertaken in only a few of the land-grant colleges; but the number is increasing. As we all recognize only too well, it is not possible to create research in home economics by action of a board of trustees, nor by other administrative action. Where are the trained women who are to undertake and foster such research? I am very glad to assume that I am not expected to answer this question; and so pass hastily on to the consideration of the next one, viz.: What can we do at the present time to prevent or discourage the appearance of half-baked conclusions drawn from incomplete experiments, inadequately reported, masquerading under the title of research work in home economics?

The fatal mistakes usually occur at the very first step taken, viz., that of formulating the problem whose investigation is to be undertaken. The tyro betrays herself by proposing that she, single-handed and alone, during the time allotted to a seminar course, will determine standards for market grades, proper methods of manufacture, and nutritive value of, let us say, cheese, or Graham bread, or what not. At the end of her allotted time she reports the few tests she has been able to make—and draws general conclusions from them.

Now the chief cause of failure, as has already been pointed out by many observers, myself among the number,<sup>1</sup> is the failure to resolve the

<sup>1</sup> "What is Experimental Cookery?" *Journal of Home Economics*, 11 (1919), p. 119. "What Constitutes Research in Home Economics?" *Journal of Home Economics*, 12, (1920), p. 58.

research problem into its simplest elements, to recognize all of the variants involved in its solution. Let me illustrate: Suppose I wish to test the truth of the statement which one occasionally hears that potatoes and other vegetables, when cooked in fireless or pressure cooker, do not have as good a flavor as when cooked by the more common methods employing the open or loosely covered kettle filled with boiling water. I select two dozen potatoes from the nearest market, pare them, place eight of them on the rack in the pressure cooker, place the second lot of eight in a kettle of salted boiling water over the stove, place the third lot in a fireless cooker, also in salted boiling water; follow the customary procedure appropriate to each method of cooking; select eight trustworthy and discriminating judges, seat them together at a table, distribute to each three potatoes, i. e., one from each lot; record and tabulate their discussion of the relative merits of these products; draw and summarize my conclusions from this discussion. Have I then contributed something of real worth toward the solution of this question, something which will serve to indicate why it is, that there are differences of opinion with regard to this matter? At once we must admit that I have not done so, unless my experiments allow for the possibility of different conclusions which might conceivably have been arrived at if I had taken into account the kind of potato selected, whether waxy or starchy, whether inclined to darken when cooked or to remain white, its characteristic flavor, the mildness or strength of this flavor; differences which might result from using potatoes which would average larger or smaller than those selected, thus calling for a longer or shorter cooking period; differences in flavor and texture among individual potatoes of any given lot, which may be the cause of disagreement among judges, and which could have been avoided by mashing all potatoes of any lot together; differences among types of fireless cookers and the various methods of managing them, particularly with regard to the use or lack of heated radiators; differences due to the fact that two lots of potatoes are cooked in water and with salt, the third in steam and possibly without salt, whereas both steam and water should have been used in case of the pressure cooker and of the open kettle; differences due to the different amounts of water left in the potatoes with different manipulation; differences which may be due to frequently occurring failure of the pressure gauge of a steam pressure cooker which has seen long service to indicate the true pressure and temperature within the vessel; differences due to the diversity in taste of the judges, some of whom may prefer mealy potatoes or those of mild flavor, while others may prefer waxy ones or those of stronger flavor; differences due perhaps to the fact that some of the potatoes of any given lot have cooled faster than have the others, since the flavor of potatoes does change with cooling; differences due to the fact that some judges use so much salt or pepper as to obscure other flavors; differences due to the tendency of many judges to be more or less influenced by expression of opinion of other judges, particularly of the more influential of their number. I may not be able to plan or to perform experiments which eliminate or equalize all of these variants and others which might be mentioned, but I must at least recognize in my final report, the fact that my conclusions might have been different if some of these conditions had been different.

What are the chief methods by means of which a given research organization may seek to assist its workers and minimize the occurrence of such errors as those above mentioned? How may we facilitate contacts among workers in different fields and among different workers in the same field?

(1) By proper provision for publication of results of research work, which are not yet ripe for distribution to the general public. What we need is something on the order of the "reprints" issued from the U. S. Bureau of Standards, which state frankly that they are intended only as a basis of discussion among research workers, and not for wider distribution. The *Journal of Home Economics* can hardly be expected to attempt this; it must serve not merely research workers, who are relatively few in number, but also home economics teachers and extension workers of all grades and kinds, as well as housewives and the general public. What would happen if there were only one journal to serve all the varied interests of chemistry or botany or economics or art? Yet the field of home economics is wider and more varied than is that of any of these contributing sciences.

(2) By careful fostering of the beginnings of cooperative research in home economics which are just appearing above the horizon. Can not this section lend its specific endorsement to the plan of following recognized leadership in research, or lacking that, of consulting contemporaries in investigation of any given topic? e. g., it might ask its members who contemplate beginning textile research, to follow the work being planned by the research committee on Textile Standardization of the American Home Economics Association, working with the National Research Council and the U. S. Bureau of Standards. It might recommend to all its nutrition workers, that they follow the standardized procedure being laid down by the special committee appointed for that purpose last September by the Division of Biological Chemistry of the American Chemical Society. It might make known in similar fashion the initiation at Swampscott last June of a specific cooperative project, a study of emulsions in mayonnaise, under the leadership of Dr. Mark of Simmons College, in which staff representatives of half a dozen of our best known colleges and universities (several of them land-grant colleges) signified their intention to take a part. It might encourage the annual publication of outlines of projects in experimental cookery, which should include analyses of problems somewhat similar to that which I have just attempted with reference to the cooking of potatoes, except that they should, of course, be very completely thought out, i. e., they should contain a digest of the ideas of a number of workers before being considered complete. Conceivably it might even initiate cooperative research projects of its own by securing statements from the home economics departments of agricultural colleges as to research projects already undertaken and the length of time they have been carried on, with a view to locating new project leaders in research.

(3) Can we establish the precedent of calling for research records sufficiently complete so that it is possible for the reader to repeat the tests described, if she so desires, with a fair chance of securing the same results as those reported in the original investigations? This is the only efficient safeguard against the wide dissemination of untrustworthy announcements of results which can not be substantiated by the work of

others. A research report of a dozen pages on cake making which mentions amounts of flour and baking powder in milligrams and amount of eggs by their number rather than by their weight, should be discredited for three reasons, first because it reveals an unnecessary waste of time in weighing flour and baking powder, second, because it shows utter disregard for the frequent differences in the size of eggs, which have often considerable effect upon the texture of cake, and third, because of the lack of discrimination shown in selecting a general title for the account of an investigation which is necessarily exceedingly limited in scope. For what is research if it is not careful discrimination?

MISS ABBY L. MARLATT, University of Wisconsin. The question is not so much what is research in home economics, as how to get money, backing, and public support for it. We should insist that experiment station funds be used in such research.

MISS RUTH A. WARDALL, University of Illinois. Home economics is in the same need today that agriculture was when the experiment stations were established. Where can we get support?

DR. BALL. The Purnell Bill will support this work.

It was moved and seconded that a committee be appointed to make a report on: (1) What shall constitute the qualifications for teachers of graduate courses in home economics? (2) How can cooperation in graduate work in home economics and agricultural courses and related sciences be obtained?

Miss Edna N. White of the Merrill School of Home-Makers, Detroit, Michigan, presented the following report on an experiment at that school in the organization of a college course in child care:

#### ORGANIZATION OF A COLLEGE COURSE ON CHILD CARE

BY EDNA N. WHITE

As director of a foundation for developing work along the lines of home-making and child care, I very much appreciate the opportunity of presenting to this group the outlines of the experiment we are planning to undertake in the field of training for child care. Since this organization represents so many of the leaders in the field of home-making education we hope to secure your interest and suggestions for this project.

As you already know, we had formulated the policy of supplementing the work of agencies already in the field. It seemed to us one of the most vital and pressing problems confronting agencies engaged in home-making education was that of developing better methods of training in child care. In most courses involving technique as well as an understanding of fundamental principles, laboratory work is developed as a component part of the work, as for example in chemistry, nutrition, engineering courses, and others. In the case of child-care courses several problems have made this development difficult. In the first place, children are delicate laboratory material somewhat difficult and trying to handle without injury; secondly, the problem of the possible exploitation of the children in the attempt to educate students is one that arises in the mind of the psychologist; and

finally the question of the cost involved in providing as nearly as possible ideal conditions and training for children of pre-school ages.

With these problems in mind a study was first made of the nursery schools as developed under the Fisher Act in England to see what features were desirable from the standpoint of our needs in America. These schools have especially emphasized health training and care but have endeavored to incorporate as well the best features of day nursery and kindergarten training, although instruction of any formal type is avoided. Of course the skill and success with which these features are developed depend upon the vision, training, and personality of the teacher in charge.

It was decided, after considerable investigation and discussion, that in our own experiment the mental phases of child development should receive special consideration, and with this in mind Mrs. Helen Thompson Woolley was secured to direct the organization and development of this piece of work. The project is, of course, in the experimental stage and, therefore, permanent needs and policies can not be outlined. We hope to determine how to best develop the children physically and mentally and socially by enlarging the child's experience in response to its developmental needs. This group of children should offer, if the conditions are desirable for them, a laboratory for training students in child care. To accompany this the students must have courses in child psychology, nutrition, health, and sociology. There should be opportunity, also, for study and contacts with the social agencies dealing with the child and the family.

**MISS MARLATT.** What opportunity will there be to send graduate students to take part in this work?

**MISS WHITE.** We will need some time to get the work established. When this has been done, it will be possible to give opportunity to graduate students.

Miss Anna E. Richardson of the Federal Board for Vocational Education presented the following special report of the home economics subcommittee of the Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts, with the explanation that this was a continuance of the work presented at the Springfield, Massachusetts convention of the association.

#### RECOMMENDATIONS REGARDING INSTRUCTION IN HOME ECONOMICS

(1) Inasmuch as lack of preparation together with inability to present subject matter to students is one of the causes of difficulty, reported by both administrators and teachers, in attempting to do good college teaching:

Your committee recommends that the Section of Home Economics of the Association of Land-Grant Colleges go on record as favoring certain standards for the training of members of the teaching staff:

(a) For heads of major departments the equivalent of advanced work in the special field.

(b) For teaching positions, professional preparation for teaching and experience in teaching in addition to training in technical subject-matter.

(c) For teachers of professional courses, preparation for teaching including advanced work in education and varied experience in teaching



which should include teaching in the type of school for which the instructor is preparing teachers.

(2) That the director of the department of home economics, assume responsibility for the improvement of the teaching of the home economics staff and that by means of faculty seminars, round-tables, and conferences, a study be made of the best method to be used in analyzing methods of teaching and in measuring good teaching.

(3) That the director of the department of home economics devise ways and means to provide opportunities for improving the work of the teaching staff and that members of the home economics faculty be urged to take advantage of all leaves granted to engage in research connected with the special field for which they are responsible.

(4) Inasmuch as the reports from administrative officers and from the teachers themselves indicate that no considerable number of home economics teachers are enriching their experience by any considerable contact with the vocation of home-making, that the administrative heads of home economics divisions or departments encourage such contact as one of the important means of enlarging the preparation of the staff.

(5) As the reports show that no adequate measure to determine the success of college teaching has been devised, it is urged that the home economics faculties study this problem so that we may make further recommendations as to the importance of such factors as supervision, interest of the teacher in her work, opinions of co-workers, and success of her students in determining successful teaching.

(6) As the answers to the questionnaire suggest various points to be considered as the basis for promotion, such as community service, successful teaching, professional study, ability to do advanced work, interest in work and in institution, further study is recommended to determine the relative importance of these suggestions in arriving at some of the essential factors which should be taken into account in all promotions.

(7) Inasmuch as there is still in the minds of certain administrators a lack of appreciation of the value of good teaching as essential in a college staff responsible for training teachers, it is recommended that the Section of Home Economics go on record as believing in the necessity for good teaching as fundamental to the development of home economics in the colleges.

(8) That the Section of Home Economics devote time to the study of the questions outlined in the committee's report and that reports be made at the meeting next year.

Respectfully submitted,

MARY E. SWEENEY,  
BERTHA M. TERRILL,  
ANNA E. RICHARDSON,  
*Sub-Committee.*

On motion, the report was adopted.

WEDNESDAY MORNING, NOVEMBER 9, 1921

TRAINING OF WOMEN FOR EXTENSION WORK

This subject was discussed by Miss Florence E. Ward and Miss Madge J. Reese, States Relations Service, United States Department of Agriculture.

No report of Miss Ward's remarks was furnished for publication.

**MISS MADGE J. REESE.** At the American Home Economics Association in June we were told that there were 10,000 women trained in home economics in the United States. The present number of home demonstration workers in the United States is 1,044, according to latest count. If we say that an average of five (both State and county workers) is added in each of the 48 States, that would mean only 240 additional home economics women needed for home demonstration work the coming year. Five may be too small an average. I have seen the budgets of most of the southern States for the present fiscal year and some of them have provided for from 10 to 15 new agents. That means that this number will be added, provided sufficient local funds are secure and the right kind of agents found. I do not believe the States will have much difficulty finding the trained home economics women, but we want training plus some other things, and it is those other things which are hard to find.

As home demonstration work has developed and expanded, the woman agent finds more and more opportunities for service and the standards of her qualifications have become higher and higher. We must remember, however, the devoted and heroic pioneer in the South who succeeded with less training because of singleness of purpose and thoroughness of execution. We hope our better trained agents will still consider it their first duty to help rather than to instruct. There is no limit to the amount of knowledge they may seek for themselves but there is a limit to the amount they must try to impress at a given time and upon a certain situation. There are certain things we want the agent to know and especially certain things we want her to be.

I have been into 63 different counties in the 15 southern States and have observed first-hand the work of that many agents in their counties, and have come in contact with several hundred agents at State meetings. The more I study the work of the agents and the more I know of the results, the more fully I realize that the county home demonstration agent is the most important factor in this great piece of educational work known as home demonstration work.

I shall have to tell you what we want the home demonstration agent to be, very briefly in the short time given. We want her to be a good trainer or guide, guiding the women and girls in demonstration activities so that the community will see and feel the effects. Dr. Seaman Knapp said to the first, small group of home demonstration workers ever assembled, "Your value lies not in what you can do, but in what you can get others to do." Also we want the home demonstration agent to inspire in the farm women and girls with whom she works the larger motive of helping others by their demonstrations and accomplishments. We want the county home demonstration agents to have some practical knowledge

about the garden, the orchard, the poultry yard and the farm home dairy work. The man agent gives some help in these farm home productive activities but he does not make them his larger interests. Nine times out of ten the farm woman usually manages these activities and she wants to learn improved methods and needs information, so she turns to the county home demonstration agent.

Of course we want the home demonstration agent to have a technical and practical knowledge of foods, clothing, health, sanitation, recreation, and other things which might be added to the list, but she need not be a specialist in any one of these subjects. She must be an ambassador and a diplomat. As Mr. O. B. Martin has said, "She is an ambassador extraordinary and she ministers potentially to the greatest institution on earth—the home." We want her to be able to keep harmonious relationships with all agencies in the county doing educational and public welfare work. It goes without saying that this agent must possess, first of all, the spirit of service, and important requisites are good health and a saving sense of humor. We prefer the matured woman, one who has lived enough years to have had time to develop sound judgment and keen discrimination.

This is a great woman I have pictured, but she is quite possible and there are several hundred such agents on duty today throughout the United States. I am not particular how or where she gets the training and experience which will make her what I want her to be. She can be a normal school graduate or a university or college graduate. We should like for her to have at least two years of home economics and agricultural training. We should like for her to have had experience in teaching or in business, in farming or in housekeeping. Some of our best agents are married women. I believe Oklahoma can boast of the longest tenure of service of the States I know best. Her present force of 43 agents has been on duty an average of four years. Nineteen of these agents are married women. They have homes in the counties, are more settled and stay on the job longer, and as far as we are able to determine, do just as effective work as the unmarried agents.

It isn't necessary that college courses for preparing home demonstration workers be made different from those for preparing home economics teachers. Any woman who contemplates being of some use in this world needs good, sound, general training, which will help her to educate herself as she lives and works. Someone has well said that "education is the thing that a person has left after he has forgotten all that he has learned." Extension work is something one has to learn by doing it. The special extension courses which some of the colleges and universities are offering are most helpful and valuable and we hope more of them will be offered. The catalogues show that they are called technique of extension work, extension teaching, extension methods, principles of home demonstration work, history of extension work, and the like. Put all these courses together and you could make one or two very fine courses. It seems to me that nothing could be more interesting than to plan and teach such courses. The general and rural sociology courses should give more time to the study of the agricultural and home economics extension work.

I do not like to see too many prerequisites put on the extension courses, especially for the experienced woman who comes in to spend a year in college before going into extension work. These courses should be taught

by people who have had experience in extension work and a wide experience in field work. It is hard to get such instructors because there are not many extension workers who have yet retired from field service. Home demonstration work is about 11 years old and any movement that can boast of a decade of age deserves to be studied historically. From now on we shall ask our colleges to teach us historically.

#### COMMITTEES

The chairman announced the appointment of the following committees:

(1) A committee to recommend the minimum qualifications of teachers of graduate courses and suggest basic subjects other than home economics which must be included. This committee consists of the following: Miss Emma L. Wardell, chairman, and Dr. Minna C. Denton.

(2) A committee to confer with the extension section concerning holding one joint session at the next meeting. This committee is composed of Miss Martha Van Rensselaer, Miss Juliet Lita Bane, and Miss Laura F. Neale.

(3) A committee on standards of research composed of Dr. Helen B. Thompson, Dr. Minna C. Denton, and Miss Martha Van Rensselaer.

#### QUALIFICATIONS FOR MAJOR EXTENSION POSITIONS

The following resolution was adopted:

The Section of Home Economics recommends that whenever vacancies occur in the positions of State leaders, subject-matter specialists, and county home demonstration agents, selection shall be made from persons whose minimum qualifications are a four-year course or its equivalent with specialization in home economics.

For approval by the Executive Body of this resolution, see page 353.

Mrs. A. E. Bridgen, president of the New York Federation of Home Bureaus, presented the following paper:

#### THE HOME BUREAU

By Mrs. A. E. BRIDGEN

The home bureau organization of New York State is very young, and hence has a comparatively brief life history. Neither has it enough of a past to justify any prophecy of its future. Nor can the home bureau plan of organization be considered, by any means, as the "last word" in organization. It is only one venture among others and the future alone can determine its permanent value. However, the whole farm bureau movement is still in process of development and the place given to women, although perhaps theoretically, at least determined, has not yet been very practically worked out in the majority of the States. There can be no question, however, as to the intent to give them due place. Economic questions have been and are so insistent that those problems of rural life in solving which women are best able to render valuable service have not yet received their due consideration. This method of procedure is but natural and above questioning.

At the present time, however, the place of women is receiving special attention, and changes in the farm bureau organization in the different States are sure to result in consequence. It is very questionable whether any one type of organization will very soon be evolved suitable to the conditions of all the States; nor is this necessary. Each knows best its own particular problems and how to meet them. Some States are very rural, others have a large urban population; some have comparatively small farms occupied by their owners and in others farms are large and often the tenant system prevails with its consequent shifting population. Also, the population in some States is heterogeneous, while in others it is homogeneous. These and other differences no doubt affect women's problems in the farm bureau organization even more than men's.

The American Farm Bureau Federation has only recently appointed a committee of five representative women to work out women's place in the federation.

In New York State the subject under discussion received serious consideration even before the close of the war and the present plan of farm and home bureau organization was evolved. At that time farm bureaus were already organized in many of the counties of the State and farm bureau agents employed. Women were eligible to membership therein and some interested in the business of farming belonged to the organization. Also in four counties of the State home demonstration agents were employed. It was later felt advisable to give woman's work a more definite and distinctive place. It seemed wise for the best interests of extension work that a strong field organization of women should be developed, not only to assist the county agents in extension work, but to relieve her of many duties which might better be assumed by the women themselves. Again, a strong organization of rural women would serve as a means of developing initiative, latent talent for leadership, and afford the women an opportunity for self-expression—things as greatly needed and desired by rural women as the assistance provided through the extension service and county home demonstration leaders. It was felt desirable to create an organization which, while recognizing the basic fact of but one organization for men and women, should give the women in reality as well as in theory a fifty-fifty chance, neither group interfering with the full and uninterrupted development of the other, while the two groups could act as a unit in all matters where efficiency and the highest interest of all demanded. In a word, to develop such harmony and true unity as may only be developed where the principals involved have equal rank and privilege.

The approved form of county organization, therefore, provides for an executive board of fifteen, seven men and seven women, elected by their respective departments. The fifteenth member is chosen by the joint board and may be either a man or a woman. The name of the county organization is "The County Farm and Home Bureau Association." It has two departments, namely, the farm department under the charge of the men directors, and the home bureau department in charge of the women directors. Each department elects its necessary officers and makes out its own budget, although the final adoption of both budgets is a matter of business concern for the joint board. The farm bureau department was started in all counties first, but a home bureau department is not organized within any county until at least five hundred women have expressed the

desire for such an organization and have agreed to pay an annual membership of one dollar each to its support. Until this has been done, no steps are taken to organize such a department. This requirement seemed rather severe at first but it has proved the most important factor in developing a safe and enduring woman's organization. Before five hundred women band themselves together to support a piece of work, they must be thoroughly convinced of its value, of the responsibility involved in the undertaking and are generally, therefore, ready to assist enthusiastically in its development. A home demonstration agent is not placed in any county until such a home bureau department is organized. There are in all, at the present time, thirty-one organized farm and home bureau counties in the State and three city home bureaus. Men and women may join either or both departments by fees if they so desire, a regulation which holds in practice as well as in theory. The plan of individual membership, while desirable for reasons already given, also enables unmarried women and women living in rural towns and villages to join either department. Among this number are often found our most efficient workers. An interesting commentary on this plan lies in the fact that the membership has increased from eight thousand to twenty-seven thousand in less than three years, while not one organized county has lapsed.

Community organization is well developed throughout the State and county advisory councils and annual meetings are well attended. The two departments usually hold separate morning sessions at these meetings and a joint meeting in the afternoon. This plan is in the best interest of the highest efficiency and at the same time gives each department an opportunity to become acquainted with the work of the other.

Home-making needs to be dignified as a profession and it will be when women themselves realize the importance of their own calling.

There is a great difference between the education demanded for efficiency in housekeeping and efficiency in home-making, and while the projects relating to physical housekeeping may possibly be ranked on a par with such other projects as livestock, soils, and poultry, it is certainly unfortunate if home-making is ever so classified. Extension work may have up to the present time, for good and sufficient reasons, seemed to be more concerned with the problems of physical housekeeping, yet possibly as a sort of by-product home-making as a whole has obtained more thoughtful attention. Home bureaus of New York State are stressing in their programs this year the need of such a modified school curriculum as will fit girls for this most important of all callings. This it seems to me is one of the greatest opportunities for service afforded to the home bureau organization.

Again, since efficient physical housekeeping releases some of the home-maker's time, the right direction of such time released is a problem for consideration. Community housekeeping, better schools, better churches, better recreation are other matters of particular interest in the development of rural life.

It is to the credit of the extension service and to the impetus given by the home bureau organization that the field is at present asking for a larger and richer program than the extension service is as yet able to supply. This is but a sign of healthy growth and should be considered the best possible evidence to both the taxpayer and to the Department of

Agriculture that the appropriation for extension work really functions in a large way. It might be considered that the field through the development of extension education is entering into what might be termed the adolescent period, with an attitude toward life belonging to that age. If so, it needs and craves very wise guidance and direction.

The county farm bureau departments are organized into a State Federation of Farm Bureau Associations and the home bureau departments into a State Federation of Home Bureau Associations. An organic relationship is established between the two departments by the creation of the United Federation of State Farm and Home Bureaus with a board of directors composed of the executive committees of the two federations with officers named from among their number. Joint committees report to this organization and matters of mutual interest are considered at called meetings. The federation holds frequent meetings of the executive committee during the year also. It also holds a meeting of the advisory council consisting of one duly elected delegate from each county, at "Farmers' Week." An attractive banquet is also held at the same time. In November occurs the annual meeting, continuing two days, when a second meeting of the advisory council is also held.

The State is divided into four districts for the purpose of better administration, for the promotion of inter-county acquaintance and exchange of experience. One of the most important committees appointed this year is that of four representative women on program and policies for conference with the college staff regarding field needs from the field viewpoint. Dean Mann referred to the importance of this committee in his valuable paper read yesterday before this body.

The federation has a ten-year and a one-year program. A few of the activities noted on the program for 1921 and which were actually developed, are as follows:

(1) Speakers' bureau: To assist in membership campaigns and organization work and to present rural facts and rural viewpoint to urban audiences with a view to bringing about a better understanding between producer and consumer.

(2) Legislation: To study pending legislation relating to home and community interests and furnish information and recommendations regarding it to home bureau associations. To support plans to increase State funds for home and farm bureau work.

(3) To cooperate with the State Department of Health on the social hygiene program.

(4) To assist in every way the joint Committee on Rural Schools of the State.

(5) To foster the existing agencies in rural communities that may help if they are to survive, as the country store, country newspaper, and rural church.

(6) To promote the establishment of playground and equipment and home-making courses in the public schools.

Some other achievements of the year are, first, helping with the country store conference; second, serving as the voice of the organic, organized rural home-makers of the State; third, helping to establish cooperative relations with other organizations; fourth, helping to secure a woman representative on the State Fair Commission; fifth, cooperating with the

State College of Agriculture through a joint committee on education.

The most fundamentally important work of the year is through representation on the Committee of Twenty-One, a committee which has been engaged for eighteen months on a very careful survey of the rural school conditions of the State. This piece of work has cost money, but if it results in better schools for rural children, it will prove money and time well expended.

Possibly this brief survey will give a glimpse of some of the ambitions of the New York State Federation of Home Bureau Associations, which in a word is simply a union of home-makers pledged to the enrichment of home life and to the betterment of that larger housekeeping of the community that reflects itself in the homes of the community. It has been said "that the only difference between the difficult and the impossible is that the impossible takes a little more time." Then, why not all work together to achieve the impossible—the bringing of that golden age when "every home will be developed into an institution economically sound, mechanically convenient, physically healthful, morally wholesome, mentally stimulating, spiritually inspiring, socially responsible—a center of unselfish love?"

WEDNESDAY AFTERNOON, NOVEMBER 9, 1921

#### ELECTION OF OFFICERS

Officers of the section for the ensuing year were elected as follows: Chairman, Dr. Louise Stanley, University of Missouri; secretary, Miss Faith R. Lanham, Ohio State University.

#### RESOLUTION REGARDING THE DEATH OF DEAN MACKAY

A resolution of sympathy with the family of the late Dean Catherine J. MacKay, Iowa State College, was adopted.

#### THE PURNELL BILL

G. I. CHRISTIE, Director Indiana Experiment Station, outlined briefly the scope and purpose of the Purnell Bill.

On motion, a committee was appointed to follow the legislative progress of the Purnell Bill and to convey to the experiment stations the sentiment of the section in favor of home economics research.

Adjourned.



## MINUTES OF THE EXECUTIVE BODY

WEDNESDAY, NOVEMBER 9, 1921

The Executive Body was called to order by the president of the association, Dean H. L. Russell of the University of Wisconsin.

On motion, all ineligible members of the Executive Committee and the secretary-treasurer of the association were invited to sit with the Executive Body, the latter to act as secretary.

### REPORT OF COMMITTEE ON COLLEGE ORGANIZATION AND POLICY

The report of the Committee on College Organization and Policy was read by the acting chairman, President C. A. Lory of the State Agricultural College of Colorado, as follows:

In presenting its 1920 report, your committee made two recommendations, viz.:

(1) That each agricultural college establish as soon as practicable a system by which precise facts concerning agricultural opportunities may be gathered, interpreted and distributed among the people of the State, particularly the young people, and that each college not only seek to give adequate training for these various vocations, but occupational counsel and advice to all students seeking the training.

(2) That a further study be made, by such committee as the association may designate, of the two-fold question whether this sort of service can be nationalized in order that States may cooperate with one another, and whether it is possible to secure a regional classification of institutions on the basis of particular lines of vocational preparation to be emphasized, in order to gain both effectiveness and economy in the use of public funds for agricultural education.

The first recommendation, as to self-examination, was adopted; in respect to the second recommendation your committee was asked further to consider the matter and to report at the next convention.

Your committee is convinced that a further study of "whether it is possible to secure a regional classification of institutions on the basis of particular lines of vocational preparation in order to gain both effectiveness and economy in the use of public funds for agricultural education" requires much more information about work and aims, about the relation of the State needs to the work of the institution, and about the support given by the State to its land-grant college, than is now available.

Your committee is able to report that tentative arrangements were made with the United States Bureau of Education for cooperation in its study of land-grant institutions with provisions for an early study of certain typical colleges, but that on account of unforeseen difficulties these plans could not be carried out. A survey was made of only one institution, the Massachusetts Agricultural College.

The economic situation confronting each State is making all tax-assessing bodies conservative and critical. It is necessary that each institution be able to justify to the people of its State the work it is doing

and show that the funds it receives are used effectively. Your committee recommends, therefore, that the work of self-study be extended this year, and calls to your attention a previous report (Proceedings, 1915, page 109) wherein a comprehensive plan for study of college organization and policy was submitted for your consideration as matters of college policy.

Your committee recommends:

(1) That a definite policy for the improvement of elementary education for country children be adopted; that each land-grant institution cooperate with other State agencies and organizations in a program for rural school betterment and make surveys and special studies of rural school conditions and needs and of means for improvement; and that it cooperate with rural communities in their efforts to secure better educational advantages for their children.

(2) In view of the fact that our institutions have been the leaders in the development of vocational education, that the college in each State earnestly cooperate with State and local agencies to make more effective the work established under the National Vocational Education Act.

(3) That the land-grant college in each State make a study of the possibilities in engineering or industrial extension service and establish such work so far as this study of conditions and its facilities justify.

(4) By way of emphasis and repeating its recommendations of former years, that as rapidly as conditions permit, engineering experiment stations be established in connection with each land-grant college giving instruction in engineering.

Respectfully submitted,

CHAS. A. LORY, *Acting Chairman*,  
W. M. RIGGS,  
W. M. JARDINE,  
R. W. THATCHER.

On motion, the report was received and, following discussion, on motion, its four recommendations and the report as a whole were adopted.

#### REPORT OF COMMITTEE ON MILITARY AFFAIRS

The report of the Committee on Military Affairs was read by the acting chairman, President W. B. Bizzell of the Agricultural and Mechanical College of Texas, as follows:

The Committee on Military Affairs begs leave to submit the following report:

Information from the War Department indicates that the Reserve Officers' Training Corps units in the several colleges and universities show an encouraging increase in numbers. Your committee is advised that R. O. T. C. organizations are now being maintained in 227 institutions, of which number 123 are of collegiate rank. The number of units in the colleges and universities is 230. The total enrollment in the senior units (collegiate institutions) is 57,748, and in junior units (high schools and academies) 36,865. There are 704 military officers and 1,318 enlisted men on detail in the 227 institutions.

There has been an increase of 26 units and 3,600 students in college units this year. The total enrollment in the advanced course for the current year is 7,534, which represents a gain of 2,470 over the preceding academic year, or approximately 50 percent.

#### RECOMMENDATIONS

The committee has discussed the problems of military education in the colleges with Colonel F. J. Morrow, and as a result, recommends:

(1) That students entering college from secondary schools maintaining R. O. T. C. units be allowed credit to an extent not to exceed two-thirds the credit value of the basic college courses; and that such students be not allowed to enter the advanced course prior to admission to the junior class.

(2) That college credit be allowed for theoretical and practical instruction in military science and tactics on the same basis as for other theoretical and practical courses in the college curriculum.

(3) That Congress be urged to provide adequate appropriations for commutation of uniforms to such institutions as may desire the same.

(4) That the War Department be requested to allow army officers on detail at the colleges who are giving satisfaction to remain for the full period of four years.

(5) That the attention of the War Department be directed to the desirability of further classification and differentiation in the several institutions maintaining R. O. T. C. organizations, with the suggestion that consideration be given to increasing the number of classifications on the basis of definite standards of proficiency.

(6) That the War Department be urged to provide for military training of those students who, though entering the institutions with advanced credit, can not comply with R. O. T. C. time regulations.

(7) That the War Department be requested to send the officer in charge of R. O. T. C. affairs to each annual convention of this association.

(8) That the subject of R. O. T. C. education be provided a place on the program of the resident teaching sub-section at each annual session.

(9) That regional conferences of presidents or deans and professors of military science and tactics be held in each corps area and that the importance of such conferences be called to the attention of the War Department.

(10) That the Executive Committee be asked to use its influence with the appropriate congressional committees in support of the War Department's estimates for maintaining the R. O. T. C. work; and that the executives of our several institutions be urged to take this matter up with their Senators and Representatives.

(11) That the Executive Body express its hearty appreciation of the cordial cooperation extended the colleges by the War Department in the administration of R. O. T. C. affairs and its sincere regret at the early expiration of the detail of Colonel F. J. Morrow, whose able and tactful administration has been a potent factor in the very satisfactory results that have been obtained.

(12) That the name of this committee be changed to that of the Standing Committee on Military Organization and Policy.

Respectfully submitted,

W. B. BIZZELL,  
WILLIS E. JOHNSON,  
W. M. RIGGS,  
S. AVERY,

*Committee.*

On motion, the report was received and, following discussion, on motion, the 12 recommendations and the report as a whole were adopted.

Colonel F. J. Morrow, in charge of Reserve Officers' Training Corps work, being introduced, stressed three points as follows:

(1) The fact that 15 percent of the basic course students were taking the advanced course, as compared with 10 percent last year, a gratifying increase, yet representing only one-sixth of the eligible students.

(2) The desirability of inducing a greater proportion of the graduates to enter the reserves.

(3) The value of the periodical inspectional visits of officers from the corps area headquarters, the desirability of their getting closely in touch with the institutional administrators and the desire of the War Department to make their visitations increasingly effective.

#### DISCUSSION OF ASSIGNED TOPICS

##### ATTENDANCE OF STAFF MEMBERS AT MEETINGS OF PROFESSIONAL SOCIETIES

During the discussion of this topic, the following points were brought out: That in several States permission to leave the State must be secured in advance from the Governor or some other state executive authority; that in some States only one person can go to a given meeting, e. g., the Association of Land-Grant Colleges; that a questionnaire had indicated no settled policy among the collegiate institutions; that in some institutions funds were budgeted for this purpose, while in others specialists were expected at their own expense to keep in touch with their special organizations; that institutions at a distance from the centers were greatly disadvantaged in this respect; that differences in practice created dissatisfaction, Professor A. of the University of B. who has to pay his own way to his professional society, complaining because Professor C. of the University of D. has his way paid by the institution; that trustees need education as to the needs of departmental heads attending society meetings.

On motion, a special committee was appointed by the president, consisting of Presidents Futrall, Kinley, and Hetzel, to determine the procedure in our various institutions and report at the next convention.

##### COMPENSATION FOR EXTRA-MURAL AND EXTRA-INSTITUTIONAL ACTIVITIES

During the discussion, the following points were brought out: That this is largely an issue with the engineering staffs; that the question has been discussed in the engineering section at this session and that the consensus of opinion of the engineering executives was to the effect that such service, on the whole, was detrimental to the interests of a college; that there are two diametrically opposed points of view, (1) that such efforts tend to vitalize classroom and laboratory work, presenting new prob-

lems, etc.—an attitude which is usually considerably overstressed and (2) that an instructor's entire time belongs to the institution and he has no moral right to sell any of it; that in some institutions this type of work is allowed only when definitely approved and permitted by trustee vote; that proper and adequate compensation for intra-mural work would help solve the problem; that the principle of paying a man an extra sum when more intra-mural work is put upon him—an amount which does not overburden him—is a thoroughly vicious one, for the reason that usually a man's whole time belongs to the institution anyhow, and that the amount of work required should be the measure quite as much as the compensation; that, as of old, it is difficult for a man to serve two masters.

#### CONFERENCES BETWEEN THE FEDERAL DEPARTMENT OF AGRICULTURE AND EXTENSION PEOPLE

During the discussion, the following points were brought out: That conferences were often called concerning which college executives were not informed, a situation which could readily be remedied by sending carbon copies to college executives; that sometimes departmental subordinates called conferences of extension subordinates without consulting the extension directors, perhaps by telegraph and, as it were, in casual ways; that too many conferences were held; that the extension directors were called into conference last year within a few weeks of the close of the Springfield convention, necessitating much extra travel, time and expense; that a somewhat similar conference was contemplated immediately preceding the present convention, but was postponed to meet in connection with the present convention; that while it is recognized that many new questions are arising, necessitating the establishment of new policies, it is quite possible that they can be handled with fewer gatherings; that in view of the great distances to be travelled, regional conferences are to be preferred to nationwide conferences; that it were well to discuss the matter frankly with the States Relations Service people with a view of determining upon a safe and sane procedure.

On motion, the incoming Executive Committee was asked to take the matter under advisement, to confer with the Assistant Secretary of Agriculture and the director of the States Relations Service with a view of arriving at some satisfactory arrangement.

#### FACULTY PARTICIPATION IN ADMINISTRATIVE AFFAIRS

During the discussion, the following points were brought out: That in most institutions there were faculty members who did and those who did not want a finger in the administrative pie; that in some institutions new instructors were promptly informed as to the administrative procedure so that they could orient themselves and from the very outset do better team work; that while the counsel of faculty members was often timely in respect to the solution of administrative problems, in the last analysis the responsibility was presidential; that while democracy is ideal, a certain degree of autocracy is sometimes more effective; that institutional ideals can often best be realized by frequent consultation with and support by faculty members; that in a certain institution a self-appointed group of faculty members acted in an advisory way to the Board of Trustees, expressing a strong preference, amounting in the opinion of some

almost to dictation, as to the choice of a new president; that the delegation of administrative functions tended to weaken an administration; that counsel and conference were well worth while, but that decision was an executive function.

On request, Dean Mann outlined the Cornell system as follows: The university faculty chooses three of its members as members in full standing, except the power to vote, of the board of trustees of forty-one members. The board has created within itself a series of special college committees or councils. Thus, for the college of agriculture there are twelve trustees, including the president, and with these sit two agricultural college representatives, heads of departments, chosen by their colleagues. The dean as an additional member of the council presents business at each council meeting. The president, who *ex-officio* is chairman of each council in the university, is fully consulted in advance with reference to all business to be presented. Each council reports to the full board for confirmation. This scheme has advantages and disadvantages. The faculty representatives are able directly to advise the trustees on questions having educational bearings. On the other hand, they have knowledge which may be embarrassing, as to salaries, etc.; they pass on the salaries of their associates; and there are other disadvantages. At present these men have no vote, which is a source of irritation to some members of the faculty. These faculty trustee members can not freely report back trustee discussion and action to their faculties and that makes for difficulty. There is a tendency on the part of the faculty to desire to elect professors emeritus or other persons not in the membership of the faculty. However, on the whole the arrangement has been useful, although with the present experience in mind, were the proposition to be reconsidered, perhaps the whole question would be gone into with more care.

#### REPORT OF THE EXECUTIVE COMMITTEE

(1) *Concerning Scientific Periodicals of the United States Department of Agriculture.* The situation seems reasonably safe according to the testimony of certain Senators, Directors Ball, and Assistant Secretary Pugsley. There is some likelihood of the enlargement of these periodicals. The Executive Committee will keep in close touch with the situation.

(2) *Bureau of Education Blanks.* The matter of simplification of the blanks issued to the land-grant colleges is in hand and progress is being made.

(3) *Reorganization of the United States Department of Agriculture in respect to Extension Work.* The attention of the Executive Body is called to the reorganization of the work as set forth at length by Assistant Secretary Pugsley before the general session and the extension section. This is a matter of vital importance in connection with the expansion of these activities.

(4) *The Purnell Bill.* Owing to the situation in Congress, it seems wise at present to mark time. The friends of the measure are confident that to press matters now would result in negative action, be of no avail, and might prejudice later success. Material is being accumulated to aid in pushing the measure at the psychological time.

(5) *Engineering Experiment Station Bill.* Owing to our unhappy divisions and to the congressional situation, there seems little hope that the measure will be revived in the near future.

(6) *Fess Bill.* This measure, designed to put home economics on a parity with agriculture and the trades and industries in Smith-Hughes circles, is not likely to be pressed until the financial situation in Congress is relieved.

(7) *1922 Convention.* St. Louis, San Francisco, and Lexington, Ky., have invited the association for 1922. After some discussion the matter was referred to the incoming Executive Committee for decision.

(8) *Convention Program.* The Executive Committee recommends that copy for the program be required to be in hand 30 days in advance of the opening date of future conventions and that the program be sent to press at that date; and that sectional officers be so advised.

(9) *Sterling-Towner Bill.* This successor to the Smith Towner Bill should be carefully scrutinized by a special committee of the Executive Body, as was its predecessor, in order that its relationship to the colleges in this organization may be determined.

(10) *The Land-Grant Colleges and Smith-Hughes Activities.* The relationships are closer than they have been. This is encouraging. At the last convention there were reasons for raising the question whether all our constituent members were taking their obligations as seriously as they should.

(11) *Livestock Judging Contests.* The heads of the animal husbandry departments of certain institutions are exercised as to the lack of uniformity of practice in respect to these contests. At some institutions, much time, effort and money is put into preparing teams, their expenses are paid, experienced coaches employed, etc.; at others a less athletic-like system is employed. Mutual understanding and agreement is urged. The Executive Committee feels, however, that this is a matter which should be handled by the institutions concerned—probably not more than 20 at the most—rather than by this association.

(12) *Constitutional Revision.* The executive Committee raises the question whether certain amendments to the constitution should not be considered along the following lines:

(a) Non-presidential members of the Executive Committee to be *ex-officio* members of the Executive Body in full standing.

(b) Non-presidential members of the Executive Committee to be elected in the general session by the delegates as a whole.

(c) Admission to the Executive Body of duly accredited substitutes of absent presidents.

(d) The president and secretary of the association to be president and secretary of the Executive Body.

On motion, the sense of the Executive Body was expressed in favor of Washington as the location for the next convention; the suggestion as to the early publication of the convention program was approved; and the president was authorized to appoint a committee to bring in definite proposals for constitutional amendment. He appointed Presidents Pearson, Riggs, and Coffman.

On motion, a recess was taken until Thursday at 2 P. M.

THURSDAY, NOVEMBER 11, 1921

The Executive Body was called to order by the president at 2 P. M.

#### REPORT OF THE EXECUTIVE COMMITTEE

The Executive Committee recommended:

(1) *Association Dues.* That dues be fixed at \$75 for institutions comprising resident teaching, research, and extension; at \$55 for institutions dealing with resident teaching and extension; at \$35 for institutions dealing with resident teaching only; at \$20 for institutions dealing with research only.

(2) *American Council of Education Dues.* That the usual dues of \$100 be paid for the support of the American Council of Education.

(3) *American Council of Education Representative.* That Dean Eugene Davenport of the University of Illinois be elected representative with the American Council of Education for three years.

(4) *National Research Council Representative.* That President A. F. Woods of the University of Maryland be chosen representative with the National Research Council for one year.

(5) *Sterling-Towner Bill.* That Presidents W. O. Thompson of Ohio, L. D. Coffman of Minnesota, E. O. Holland of Washington, Chancellor Samuel Avery of Nebraska, and the chairman of the Executive Committee be constituted a special committee on the Sterling-Towner Bill to report to the Executive Committee for the information of members.

(6) *Committee Reports.* That the report of the committees reporting directly to sections or sub-sections, namely: The Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts; the Committee on Experiment Station Organization and Policy; the Committee on Extension Organization and Policy; the Committee on Engineering Experiment Stations; the Joint Committee on Projects and Correlation of Research; the Joint Committee on Publication of Research be received, filed and published in the proceedings.

On motion, the propositions stated in items 1 to 6, inclusive, were adopted.

#### REPORT OF SPECIAL COMMITTEE ON REVISION OF THE CONSTITUTION

Your committee suggests the following amendments of the constitution:

(1) That the section headed *Sections*, Par. 1, reading as follows:

"The Executive Body of the Association shall consist of the presidents or executive officers of the institutions having membership in the Association. The Executive Body shall be the legislative branch of the Association," be stricken out and, in lieu thereof, be inserted the following:

"The Executive Body of the Association shall consist of the chief executive officer of each institution having membership in the Association or a substitute duly appointed by him and shall also include all members of the Executive Committee. The Executive Body shall be the legislative branch of the Association."

(2) That the section headed *Officers*, Par. 1, reading as follows:

"The officers of the Association shall consist of a president, vice-president, and secretary-treasurer, to be chosen by the Executive Body," be



amended by the addition of the following clause: "and to serve as the officers of such body," so that it will read as follows:

"The officers of the Association shall consist of a president, vice-president and secretary-treasurer, to be chosen by the Executive Body and to serve as the officers of such body."

(3) That the section headed *Officers*, Par. 3, reading as follows:

"An Executive Committee of five members shall be chosen by the Executive Body, of which committee three members shall be chosen from the Executive Body and the remainder at large," be stricken out and, in lieu thereof, be inserted the following:

"The Executive Committee shall consist of five members, three of whom shall be presidents of institutions elected by the Executive Body, and two of whom shall be elected by the delegates to the Association in general session; provided, however, that no institution shall cast more than five votes."

Respectfully submitted,

R. A. PEARSON,

W. M. RIGGS,

L. D. COFFMAN,

*Committee.*

Considerable discussion followed the presentation of the report, centering entirely on item (3), in which the following points were brought out; that many of the deans and directors advise against it, feeling that it would be likely to result in sectional representation; that it would be difficult to make wise choices; that snap nominations might be made from the floor, wranglings result and less effective service be secured; that reasonable continuity of service in the *ad interim* representative body is advisable and less likely to be secured if this amendment is passed; that while at first thought this amendment seemed advisable, the fact that the very men whom it would enfranchise were inclined to be lukewarm, if not adverse, had caused a change of mind.

The chairman of the committee withdrew proposal 3 and, on motion, proposals 1 and 2 were accepted and referred to the Executive Body of the next annual convention.

Questions being raised as to the situation in case these amendments prevailed, whether the identity of the Executive Body would be changed or lost, whether the college presidents as such could no longer meet to discuss their problems, whether there would not be likely to be a reversion to the situation obtaining in former years when few college presidents and fewer university presidents attended, the chairman of the Executive Committee stated that there was no intention to prevent the college presidents meeting by themselves to consider their own problems. Accordingly, on motion, the Executive Committee was asked in its discretion to provide for a session of the college presidents at the next convention. In this connection, a dinner for college presidents was proposed and President Jardine was commissioned to arrange the details.

## RECOMMENDATIONS FROM SECTIONS

## SECTION OF AGRICULTURE

(1) *Resident Teaching.* The proposition, approved by the Section of Agriculture, to create a new sub-section dealing with agricultural education *per se* (see page 199), at the suggestion of the chairman of the section and the consent of the principal proponent of the proposition, was not presented, the resolution being withdrawn.

(2) *Experiment Station Work.* The recommendation reading as follows:

The Committee on Experiment Station Organization and Policy, in dealing with the proposal made by Dr. Webber last year, for a closer union of the research in agriculture between the States and the National Government, stated its belief that "the highest interest of research, both national and local, would be served by a plan under which the Department of Agriculture would undertake to conduct its researches in the States in close co-operation with the State agricultural experiment stations." It further pointed out that the provision of a director of scientific work in the Department opened the way for strengthening and expanding the cooperative relationships with the stations along the line mentioned above.

This report of the views expressed were approved by the experiment station sub-section and the proper reference ordered.

On motion, the recommendation was approved.

(3) *Extension.* The committee:

(a) Urges on extension directors and agents the importance of abiding by the terms of the memorandum of understanding.

(b) Urges care on part of county agents to confine their activities to educational lines, which may include information concerning marketing.

(c) Asks that the activities of specialists be recognized in reports of accomplishments.

(d) Asks that the Executive Committee give especial attention to the advisability of holding a limited number of regional conferences of subject-matter specialists during 1921-22.

(e) Stresses the oneness of cooperative extension work rather than its division into county agent, demonstration agent, and club work lines.

(f) Urges reconsideration by United States Department of Agriculture of the rulings concerning the recognition of farmers' institutes and farmers' weeks as legitimate extension work elicited some discussion.

Question having been raised as to recommendation (d), the chairman of the Executive Committee pointed out that the recommendation suggested that the Executive Committee "give especial attention to the advisability," etc., and that in his judgment the point of view of the incoming Executive Committee would be likely to be in favor of less rather than of more conferences, carefully thought out in advance, not called on the spur of the moment, and held only on the approval of competent authority.

In further discussion, it was pointed out that conferences of specialists would mean the establishment of bodies which, in a measure, might parallel the professional societies; that such conferences, if called, should not deal

with administrative questions but with methods of extension teaching and the character of subject matter.

On motion, the recommendations were adopted.

#### SECTION OF ENGINEERING

(1) *Appropriation.* The engineering section requests that the Executive Committee place to the credit of the standing committee on engineering experiment stations the unexpended balance of \$250 allotted for 1921, together with a second allotment of \$250 for 1922, and that the latter committee be authorized to print the eight quarterly land-grant college engineering experiment station publications for 1921 and 1922 under the name, Engineering Experiment Station Record, provided that the cost, plus the other expenditures of the committee, shall not exceed \$500 requested as above for the two years.

(2) *Convention Attendance.* *Whereas*, it has come to our attention that the attendance of deans of engineering at the present meeting has been restricted to a considerable extent by the lack of funds to meet travelling expenses and, in some cases, by the disapproval of such expense by state authorities;

*Be It Resolved:* That the Section of Engineering request the Executive Committee to urge upon college and State authorities the importance of having a representative of each engineering college, school, or department present at the sessions of the Association of Land-Grant Colleges.

On motion, the recommendations were adopted.

#### SECTION OF HOME ECONOMICS

The section recommends that as vacancies occur in offices of state leaders, subject-matter specialists, and county home demonstration agents, selections be made from persons whom minimum qualifications are a four-year college course or its equivalent, with specialization in home economics.

On motion, the recommendation was adopted.

#### REPRINTS

On motion, the Executive Committee was instructed in its discretion to furnish reprints of the address of the president of the association and of President W. O. Thompson.

#### EDUCATIONAL FINANCE INQUIRY

Chancellor Elliott of Montana presented in brief the plan for an Educational Finance Inquiry, which is contemplated under the auspices of the American Council of Education and endowed by certain great educational foundations. It is designed to conduct a careful inquiry into such matters as the necessary expenses, sources of revenue, etc., of all sorts of educational endeavor, from the grades to the university. A sum of \$170,000 has been made available and a start made in New York State in a preliminary way. The results of such a study should be available in part for use before legislatures a year or two hence. This projected enterprise seems likely to be one of the most important and influential of

recent years. A committee of nine educators are in general charge. The committee desires the cooperation of the great educational associations of the country. The National Association of State Universities has agreed to support it and the aid of this organization is solicited.

On motion, the Executive Committee was instructed to cooperate with the American Council of Education committee in the study above referred to.

#### SMITH-LEVER AND SMITH-HUGHES RELATIONSHIPS

At the request of the chairman of the Executive Committee, Dean Mann of New York, outlined the agreement made last spring touching the relationships between extension and vocational education forces in the various States. (Page 232.) He stated that the recommendations had been approved by the committees representing the other organizations, namely, the National Society for Vocational Education, the Department of Rural Education of the National Education Association, the American Association for the Advancement of Agricultural Teaching, and that the approval of the Executive Body of this association was desired. He stated that this report did not attempt to deal with details, but did aim to set forth fundamental principles.

On motion, the Executive Body confirmed the action taken by the Section of Agriculture and the general session, namely, that the report be approved as constituting an equitable suggested basis of adjustment within the States.

#### OFFICERS OF THE ASSOCIATION

The nominating committee, consisting of Presidents Lory of Colorado and Jardine of Kansas, and Director Thatcher of New York, brought in nominations as follows:

President: President T. D. Boyd of Louisiana.

Vice-President: Dean A. A. Potter of Indiana.

Secretary-Treasurer: Dean J. L. Hills of Vermont.

Executive Committee: Presidents R. A. Pearson of Iowa, W. M. Riggs of South Carolina, and A. F. Woods of Maryland; Deans A. R. Mann of New York and F. B. Mumford of Missouri.

On motion, the Secretary was directed to cast, and did so cast, one ballot for the persons named for the respective offices.

#### VOTE OF THANKS

On motion, the heartfelt thanks of the entire membership were voted to President T. D. Boyd of Louisiana State University and his associates and to the citizens of New Orleans in general for their many courtesies in connection with the Convention.

On motion, the Executive Body adjourned *sine die*.



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HARVARD UNIVERSITY  
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# PROCEEDINGS

OF THE

THIRTY-SIXTH ANNUAL CONVENTION  
OF THE

## Association of LAND-GRANT COLLEGES

HELD AT

WASHINGTON, D. C., NOVEMBER 21-23, 1922

---

Edited by W. H. BEAL  
For the Executive Committee of the Association

Aug. 1, 1923  
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F. B. MUMFORD of Missouri, *Chairman*, ALFRED ATKINSON of Montana, and H. L. RUSSELL of Wisconsin; with E. D. BALL, E. W. ALLEN, and W. A. TAYLOR of the U. S. Department of Agriculture.

*Committee on Publication of Research*

J. G. LIPMAN of New Jersey, *Chairman*, W. A. RILEY of Minnesota, and G. R. LYMAN of West Virginia; with K. F. KELLERMAN, E. W. ALLEN, and C. L. MARLATT of the U. S. Department of Agriculture.

## The Land-Grant Colleges

**ALABAMA**—**ALABAMA POLYTECHNIC INSTITUTE**, *Auburn*. Spright Dowell, *President*; D. T. Gray, *Dean College of Agriculture, Director Experiment Station*; L. N. Duncan, *Director Extension Service*; J. J. Willmore, *Dean Faculty of Engineering and Mines*; Agnes E. Harris, *Head Home Economics Department*.

**AGRICULTURAL AND MECHANICAL INSTITUTE FOR NEGROES**, *Normal*. T. R. Parker, *President*.

**ALASKA**—**ALASKA AGRICULTURAL COLLEGE AND SCHOOL OF MINES**, *Fairbanks*. C. E. Burwell, *President*.

**ARIZONA**—**UNIVERSITY OF ARIZONA**, *Tucson*. C. H. Marvin, *President*; J. J. Thornber, *Dean College of Agriculture, Director Experiment Station*; W. M. Cook, *Director Agricultural Extension Service*; G. M. Butler, *Dean College of Mines and Engineering*; DeRossette Thomas, *Director School of Home Economics*.

**ARKANSAS**—**UNIVERSITY OF ARKANSAS**, *Fayetteville*. J. C. Futrall, *President*; B. Knapp, *Dean College of Agriculture, Director Experiment Station*; M. T. Payne, *Director Agricultural Extension Service (Little Rock)*; W. N. Gladson, *Dean College of Engineering*; Stella Palmer, *Head Home Economics Department*.

**AGRICULTURAL, MECHANICAL AND NORMAL SCHOOL**, *Pine Bluff*. R. E. Malone, *Superintendent*.

**CALIFORNIA**—**UNIVERSITY OF CALIFORNIA**, *Berkeley*. D. P. Barrows, *President*; T. F. Hunt, *Dean College of Agriculture*; C. M. Haring, *Director Experiment Station*; B. H. Crocheron, *Director Agricultural Extension*; C. L. Cory, *Dean College of Mechanics*; Mary F. Patterson, *Chairman Department of Household Art*; Agnes F. Morgan, *Chairman Department of Household Science*.

**COLORADO**—**THE STATE AGRICULTURAL COLLEGE OF COLORADO**, *Fort Collins*. C. A. Lory, *President*; C. P. Gillette, *Director Experiment Station*; Roud McCann, *Director Extension Service*; LD Crain, *Chairman Division of Engineering*; Inga M. K. Allison, *Head Department of Home Economics*.

**CONNECTICUT**—**CONNECTICUT AGRICULTURAL COLLEGE**, *Storrs*. C. L. Beach, *President*; E. H. Jenkins, *Director Storrs Experiment Station*; B. W. Ellis, *Director Extension Service*; M. Estella Sprague, *Dean of Home Economics*.

**CONNECTICUT AGRICULTURAL EXPERIMENT STATION**, *New Haven*. E. H. Jenkins, *Director*.

**DELAWARE**—**UNIVERSITY OF DELAWARE**, *Newark*. Walter Hullihen, *President*; C. A. McCue, *Dean School of Agriculture, Director Experiment Station, Director Extension Service*; M. Van G. Smith, *Acting Dean School of Engineering*; Laura V. Clark, *Professor of Home Economics*.

**STATE COLLEGE FOR COLORED STUDENTS**, *Dover*. W. C. Jason, *President*.

FLORIDA—UNIVERSITY OF FLORIDA, *Gainesville*. A. A. Murphree, *President*; Wilmon Newell, *Dean College of Agriculture, Director Experiment Station, Director Extension Division*; J. R. Benton, *Dean College of Engineering*.

FLORIDA AGRICULTURAL AND MECHANICAL COLLEGE FOR NEGROES, *Tallahassee*. N. B. Young, *President*.

GEORGIA—GEORGIA STATE COLLEGE OF AGRICULTURE, UNIVERSITY OF GEORGIA, *Athens*. A. M. Soule, *President*; J. P. Campbell, *Director Extension Division*.

GEORGIA EXPERIMENT STATION, *Experiment*. H. P. Stuckey, *Director*.

GEORGIA STATE INDUSTRIAL COLLEGE FOR COLORED YOUTHS OF THE UNIVERSITY OF GEORGIA, *Savannah*. C. G. Wiley, *President*.

HAWAII—UNIVERSITY OF HAWAII, *Honolulu*. A. L. Dean, *President*.

IDAHO—UNIVERSITY OF IDAHO, *Moscow*. A. H. Upham, *President*; E. J. Iddings, *Dean College of Agriculture, Director Experiment Station*; L. W. Fluharty, *Director Extension Division (Boise)*; C. N. Little, *Dean College of Engineering*; Katherine Jensen, *Professor of Home Economics*.

ILLINOIS—UNIVERSITY OF ILLINOIS, *Urbana*. D. Kinley, *President*; H. W. Mumford, *Dean College of Agriculture, Director Agricultural Experiment Station, Director Extension Service*; M. S. Ketchum, *Dean College of Engineering, Director Engineering Experiment Station*; Ruth A. Wardall, *Head Department of Home Economics*.

INDIANA—PURDUE UNIVERSITY, *LaFayette*. E. C. Elliott, *President*; J. H. Skinner, *Dean School of Agriculture*; G. I. Christie, *Director Agricultural Experiment Station, Director Department of Agricultural Extension*; A. A. Potter, *Dean Schools of Engineering, Director Engineering Experiment Station*; Mary L. Matthews, *Head Department of Home Economics*.

IOWA—IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, *Ames*. R. A. Pearson, *President*; C. F. Curtiss, *Dean Division of Agriculture, Director Agricultural Experiment Station*; R. K. Bliss, *Director Agricultural Extension*; A. Marston, *Dean Division of Engineering, Director Engineering Experiment Station*; Anna E. Richardson, *Dean Division of Home Economics*.

KANSAS—KANSAS STATE AGRICULTURAL COLLEGE, *Manhattan*. W. M. Jardine, *President*; F. D. Farrell, *Dean Division of Agriculture, Director Agricultural Experiment Station*; H. J. C. Umberger, *Dean and Director Division of Extension*; R. A. Seaton, *Dean Division of Engineering and Director Engineering Experiment Station*; Helen B. Thompson, *Dean Division of Home Economics*.

KENTUCKY—THE UNIVERSITY OF KENTUCKY, *Lexington*. F. L. McVey, *President*; T. P. Cooper, *Dean College of Agriculture, Director Experiment Station, Director Agricultural Extension*; F. P. Anderson, *Dean College of Engineering*; L. Maybelle Cornell, *Head Department of Home Economics*.

THE KENTUCKY NORMAL AND INDUSTRIAL INSTITUTE FOR COLORED PERSONS, *Frankfort*. G. P. Russell, *President*.

LOUISIANA—LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE, *Baton Rouge*. T. D. Boyd, *President*; W. R. Dodson, *Dean College of Agriculture, Director Experiment Stations*;

W. R. Perkins, *Director Agricultural Extension Department*; T. W. Atkinson, *Dean College of Engineering*; Mattie R. Sebastian, *Director of Home Economics*.

SOUTHERN UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE OF THE STATE OF LOUISIANA, *Scottsville*. J. S. Clark, *President*.

MAINE—UNIVERSITY OF MAINE, *Orono*. C. C. Little, *President*; L. S. Merrill, *Dean College of Agriculture, Director Agricultural Extension Service*; W. J. Morse, *Director Experiment Station*; H. S. Boardman, *Dean College of Technology*; Frances R. Freeman, *Head Department of Home Economics*.

MARYLAND—UNIVERSITY OF MARYLAND, *College Park*. A. F. Woods, *President*; P. W. Zimmerman, *Dean College of Agriculture*; H. J. Patterson, *Director Experiment Station*; T. B. Symons, *Director of Extension Service*; A. N. Johnson, *Dean College of Engineering*; M. Marie Mount, *Acting Dean College of Home Economics*.

PRINCESS ANNE ACADEMY FOR COLORED PERSONS, *EASTERN BRANCH OF UNIVERSITY OF MARYLAND, Princess Anne*. J. O. Spencer, *President (Baltimore)*; T. H. Kiah, *Principal*.

MASSACHUSETTS—MASSACHUSETTS AGRICULTURAL COLLEGE, *Amherst*. K. L. Butterfield, *President*; S. B. Haskell, *Director Experiment Station*; J. D. Willard, *Director Extension Service*; Edna L. Skinner, *Head Department of Home Economics*.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, *Cambridge*. S. W. Stratton, *President*.

MICHIGAN—MICHIGAN AGRICULTURAL COLLEGE, *East Lansing*. David Friday, *President*; R. S. Shaw, *Dean of Agriculture, Director Experiment Station*; R. J. Baldwin, *Director of Extension Work*; G. W. Bissell, *Dean Division of Engineering*; Mrs. Louise H. Campbell, *Acting Dean of Home Economics*.

MINNESOTA—UNIVERSITY OF MINNESOTA, *Minneapolis*. L. D. Coffman, *President*. DEPARTMENT OF AGRICULTURE, *University Farm, St. Paul*; W. C. Coffey, *Dean Department of Agriculture, Director Experiment Station*; E. M. Freeman, *Dean College of Agriculture, Forestry and Home Economics*; F. W. Peck, *Director Agricultural Extension*; Ora M. Leland, *Dean College of Engineering*; Wylie B. McNeal, *Chief Division of Home Economics*.

MISSISSIPPI—MISSISSIPPI AGRICULTURAL AND MECHANICAL COLLEGE, *Agricultural College*. D. C. Hull, *President*; J. C. Robert, *Dean School of Agriculture*; J. R. Ricks, *Director Experiment Stations*; R. S. Wilson, *Director Extension Work*; B. M. Walker, *Dean School of Engineering*.

ALCORN AGRICULTURAL AND MECHANICAL COLLEGE, *Alcorn*. L. J. Rowan, *President*.

MISSOURI—UNIVERSITY OF MISSOURI, *Columbia*. J. C. Jones, *President*; F. B. Mumford, *Dean College of Agriculture, Director Agricultural Experiment Station*; A. J. Meyer, *Director Extension Service*; E. J. McCaustland, *Dean School of Engineering, Director Engineering Experiment Station*; Louise Stanley, *Chairman Department of Home Economics*.

LINCOLN UNIVERSITY, *Jefferson City*. I. E. Page, *President*.



MONTANA—MONTANA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, *Bozeman*. A. Atkinson, *President*; F. B. Linfield, *Dean of Agriculture, Director Experiment Station*; F. S. Cooley, *Director Extension Service*; E. B. Norris, *Dean of Engineering*; Gladys A. Branegan, *Professor of Home Economics*.

NEBRASKA—UNIVERSITY OF NEBRASKA, *Lincoln*. Samuel Avery, *Chancellor*; E. A. Burnett, *Dean College of Agriculture, Director Experiment Station*; W. H. Brokaw, *Director Agricultural Extension Service*; Olin J. Ferguson, *Dean College of Engineering*; Margaret S. Fedde, *Chairman Department of Home Economics*.

NEVADA—UNIVERSITY OF NEVADA, *Reno*. W. E. Clark, *President*; Robert Stewart, *Dean College of Agriculture*; S. B. Doten, *Director Experiment Station*; C. W. Creel, *Director Agricultural Extension*; F. H. Sibley, *Dean College of Engineering*; Sarah L. Lewis, *Professor of Home Economics*.

NEW HAMPSHIRE—NEW HAMPSHIRE COLLEGE OF AGRICULTURE AND THE MECHANIC ARTS, *Durham*. R. D. Hetzel, *President*; J. C. Kendall, *Director Experiment Station, Director Extension Service*; F. W. Taylor, *Dean Agricultural Division*; C. H. Crouch, *Dean Engineering Division*; Mrs. Helen F. McLaughlin, *Acting Head Department of Home Economics*.

NEW JERSEY—RUTGERS COLLEGE AND THE STATE UNIVERSITY OF NEW JERSEY, *New Brunswick*. W. H. S. Demarest, *President*; J. G. Lipman, *Dean of Agriculture, Director College and State Agricultural Experiment Stations*; H. J. Baker, *Director Division of Extension in Agriculture and Home Economics*; E. H. Rockwell, *Dean of Engineering*; Marion Butters, *Head Department of Home Economics*.

NEW MEXICO—NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS, *State College*. H. L. Kent, *President, and Dean School of Agriculture*; F. Garcia, *Director Experiment Station*; C. F. Monroe, *Director Extension Service*; R. W. Goddard, *Dean School of Engineering*; Blanche Gillmore, *Professor of Home Economics*.

NEW YORK—CORNELL UNIVERSITY, NEW YORK STATE COLLEGE OF AGRICULTURE, *Ithaca*. Livingston Farrand, *President of University*; A. R. Mann, *Dean College of Agriculture, Director (Cornell) Experiment Station and Extension Service*; Cornelius Betten, *Vice-Dean of Resident Instruction*; W. H. Chandler, *Vice-Director of Research*; M. C. Burritt, *Vice-Director of Extension*; D. S. Kimball, *Dean College of Engineering*; Martha Van Rensselaer and Flora Rose, *in charge Department of Home Economics*.

NEW YORK STATE AGRICULTURAL EXPERIMENT STATION, *Geneva*. R. W. Thatcher, *Director*.

NORTH CAROLINA—THE NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING, *Raleigh*. W. C. Riddick, *President*; C. B. Williams, *Dean of Agriculture*; B. W. Kilgore, *Director Agricultural Experiment Station, Director Extension Service*.

THE NEGRO AGRICULTURAL AND TECHNICAL COLLEGE, *Greensboro*. J. B. Dudley, *President*.

NORTH DAKOTA—NORTH DAKOTA AGRICULTURAL COLLEGE, *Agricultural College*. J. L. Coulter, *President*; C. B. Waldron, *Dean School of Agriculture*; P. F. Trowbridge, *Director Experiment Station*; G. W.

Randlett, *Director Agricultural Extension*; E. S. Keene, *Dean School of Mechanic Arts*; Alba Bales, *Head School of Home Economics*.

OHIO—OHIO STATE UNIVERSITY, Columbus. W. O. Thompson, *President*; Alfred Vivian, *Dean College of Agriculture*; H. C. Ramsower, *Director Agricultural Extension Work*; E. A. Hitchcock, *Dean College of Engineering*; Faith R. Lanman, *Head Home Economics Department*. OHIO AGRICULTURAL EXPERIMENT STATION, Wooster. C. G. Williams, *Director*.

OKLAHOMA—OKLAHOMA AGRICULTURAL AND MECHANICAL COLLEGE, Stillwater. J. B. Eskridge, *President*; M. A. Beeson, *Dean of Agricultural Division*; C. T. Dowell, *Director Experiment Station*; E. A. Miller, *Director of Extension*; R. G. Tyler, *Dean School of Engineering*; Ella N. Miller, *Dean School of Home Economics*.

COLORADO AGRICULTURAL AND NORMAL UNIVERSITY, Langston. J. M. Marquess, *President*.

OREGON—OREGON AGRICULTURAL COLLEGE, Corvallis. W. J. Kerr, *President*; A. B. Cordley, *Dean School of Agriculture*; J. T. Jardine, *Director Experiment Station*; Paul V. Maris, *Director Extension Service*; G. A. Covell, *Dean School of Engineering and Mechanic Arts*; Ava B. Milam, *Dean School of Home Economics*.

PENNSYLVANIA—THE PENNSYLVANIA STATE COLLEGE, State College. J. M. Thomas, *President*; R. L. Watts, *Dean School of Agriculture*, *Director Agricultural Experiment Station*; M. S. McDowell, *Director Agricultural Extension*; R. L. Sackett, *Dean School of Engineering*, *Director Engineering Experiment Station*; Edith P. Chace, *Director of Home Economics*.

PORTO RICO—UNIVERSITY OF PORTO RICO, Rio Piedras, and COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Mayaguez. J. B. Huyke, *Chancellor*; C. E. Horne, *Dean College of Agriculture*.

RHODE ISLAND—RHODE ISLAND STATE COLLEGE, Kingston. H. Edwards, *President*; G. E. Adams, *Dean Department of Agriculture*; B. L. Hartwell, *Director Experiment Station*; A. E. Stene, *Director Extension Service*; R. L. Wales, *Dean Department of Engineering*; Alice L. Edwards, *Head Department of Home Economics*.

SOUTH CAROLINA—CLEMSON AGRICULTURAL COLLEGE OF SOUTH CAROLINA, Clemson College. W. M. Riggs, *President*; F. H. H. Calhoun, *Director of Resident Teaching*; H. W. Barre, *Director Experiment Station*; W. W. Long, *Director Extension Service*; S. B. Earle, *Director Engineering Department*.

STATE AGRICULTURAL AND MECHANICAL COLLEGE OF SOUTH CAROLINA, Orangeburg. R. S. Wilkinson, *President*.

SOUTH DAKOTA—SOUTH DAKOTA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS, Brookings. W. E. Johnson, *President*; Christian Larsen, *Dean of Agriculture*; J. W. Wilson, *Director Experiment Station*; W. F. Kumlien, *Director of Extension Division*; H. C. Solberg, *Chairman Department of Engineering*; Edith Pierson, *Professor of Home Economics*.

TENNESSEE—THE UNIVERSITY OF TENNESSEE, Knoxville. H. A. Morgan, *President*, *Dean College of Agriculture*, *Director Experiment Station*; C. A. Willson, *Vice-Dean College of Agriculture*; C. A. Mooers, *Vice-Director Experiment Station*; C. A. Keffer, *Director Division of Agri-*

*cultural Extension*; C. E. Ferris, *Dean College of Engineering*; Nellie Crooks, *Director of Home Economics Department*.

AGRICULTURAL AND INDUSTRIAL STATE NORMAL SCHOOL FOR NEGROES, Nashville. W. J. Hale, *President*.

TEXAS—AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS, *College Station*. W. B. Bizzell, *President*; E. J. Kyle, *Dean School of Agriculture*; B. Youngblood, *Director Agricultural Experiment Station*; T. O. Walton, *Director Extension Service*; F. C. Bolton, *Dean School of Engineering*; E. J. Fermier, *Director Engineering Experiment Station*.

PRAIRIE VIEW STATE NORMAL AND INDUSTRIAL COLLEGE, *Prairie View*. J. G. Osborne, *Principal*.

UTAH—AGRICULTURAL COLLEGE OF UTAH, *Logan*. E. G. Peterson, *President*; G. R. Hill, Jr., *Dean School of Agriculture*; William Peterson, *Director Agricultural Experiment Station*; R. J. Evans, *Director Extension Division*; R. B. West, *Dean Schools of Agricultural Engineering and Mechanic Arts*, *Director Agricultural Engineering Experiment Station*; Jessie Whitacre, *Dean School of Home Economics*.

VERMONT—UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE, *Burlington*. G. W. Bailey, *President*; J. L. Hills, *Dean College of Agriculture*, *Director Experiment Station*; Thomas Bradlee, *Director Extension Service*; J. W. Votey, *Dean College of Engineering*; Bertha M. Terrill, *Professor of Home Economics*.

VIRGINIA—VIRGINIA AGRICULTURAL AND MECHANICAL COLLEGE AND POLYTECHNIC INSTITUTE, *Blacksburg*. J. A. Buffuss, *President*; H. L. Price, *Dean School of Agriculture*; A. W. Drinkard, Jr., *Director Experiment Station*; J. R. Hutcheson, *Director Extension Division*; S. R. Pritchard, *Dean School of Engineering*.

VIRGINIA NORMAL AND INDUSTRIAL INSTITUTE, *Petersburg*. J. M. Gandy, *President*; G. W. Owens, *Director Agricultural School*.

WASHINGTON—STATE COLLEGE OF WASHINGTON, *Pullman*. E. O. Holland, *President*; E. C. Johnson, *Dean College of Agriculture*, *Director Agricultural Experiment Station*; S. B. Nelson, *Dean and Director Extension Service*; H. V. Carpenter, *Dean College of Mechanic Arts and Engineering*, *Director Engineering Experiment Station*; Florence Harrison, *Dean College of Home Economics*.

WEST VIRGINIA—WEST VIRGINIA UNIVERSITY, *Morgantown*. F. B. Trotter, *President*; G. R. Lyman, *Dean College of Agriculture*; H. G. Knight, *Director Experiment Station*; N. T. Frame, *Director Extension Division*; C. R. Jones, *Dean College of Engineering*; Rachel H. Colwell, *Professor of Home Economics*.

THE WEST VIRGINIA COLLEGIATE INSTITUTE, *Institute*. J. W. Davis, *President*; A. W. Curtis, *Director Agricultural Department*.

WISCONSIN—UNIVERSITY OF WISCONSIN, *Madison*. E. A. Birge, *President*; H. L. Russell, *Dean College of Agriculture*, *Director Experiment Station*, *Director Agricultural Extension Service*; J. A. James, *Assistant Dean College of Agriculture*; F. B. Morrison, *Assistant Director Experiment Station*; K. L. Hatch, *Assistant Director Extension Service*; F. E. Turneare, *Dean College of Engineering*; Abby L. Marlatt, *Chairman Department of Home Economics*.

WYOMING—UNIVERSITY OF WYOMING, *Laramie*. A. G. Crane, *President*;  
John A. Hill, *Acting Dean College of Agriculture, Acting Director*  
*Experiment Station*; A. E. Bowman, *Director Agricultural Extension*;  
C. J. Fitterer, *Acting Dean College of Engineering*; Elizabeth J.  
McKittrick, *Associate Professor of Home Economics*.

## Delegates by States Attending the Convention

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- ALABAMA:** Spright Dowell, D. T. Gray, Elizabeth Mauldin, L. N. Duncan, W. D. Barton, M. J. Funchess, J. M. Moore.
- ARKANSAS:** J. C. Futrall, Bradford Knapp, Stella Palmer, M. T. Payne, W. N. Gladson.
- CALIFORNIA:** C. B. Hutchison, B. H. Crocheron, C. M. Haring.
- COLORADO:** C. A. Lory, C. P. Gillette, L. D. Crain, A. A. Edwards, Roud McCann.
- CONNECTICUT:** C. L. Beach, H. J. Baker, E. H. Jenkins, W. L. Slate, Jr.
- DELAWARE:** C. A. McCue, Laura V. Clark.
- FLORIDA:** A. A. Murphree, Henriette B. Layton, J. M. Scott, J. R. Benton, A. P. Spencer.
- GEORGIA:** H. P. Stuckey, J. K. Giles.
- IDAHO:** A. H. Upham.
- ILLINOIS:** David Kinley, H. W. Mumford, M. S. Ketchum, F. C. Bauer, W. H. Smith, E. W. Lehmann, Ruth A. Wardall, Juliet L. Bane, H. P. Rusk.
- INDIANA:** E. C. Elliott, G. I. Christie, A. A. Potter, J. H. Skinner, T. A. Coleman, Mary L. Matthews.
- IOWA:** R. A. Pearson, C. F. Curtiss, R. K. Bliss, Anson Marston, Edna E. Walls.
- KANSAS:** W. M. Jardine, F. D. Farrell, H. Umberger, R. A. Seaton, Helen B. Thompson.
- Kentucky:** F. L. McVey, T. P. Cooper, George Roberts, T. R. Bryant, G. Margaret Whittemore.
- LOUISIANA:** W. R. Perkins, W. R. Hendrix, J. G. Lee, Jr.
- MAINE:** C. C. Little, L. S. Merrill, H. S. Boardman, Frances R. Freeman.
- MARYLAND:** A. F. Woods, H. J. Patterson, F. B. Bomberger, C. O. Appleman, P. W. Zimmerman, Venia M. Kellar, T. B. Symons, H. F. Cotterman, A. N. Johnson, Marie Mount, A. G. McCall, J. E. Metzger.
- MASSACHUSETTS:** K. L. Butterfield, S. B. Haskell, J. D. Willard, A. W. Gilbert.
- MICHIGAN:** David Friday, R. S. Shaw, R. J. Baldwin, G. W. Bissell, W. H. French, F. A. Spragg, Louise H. Campbell.
- MINNESOTA:** W. C. Coffey, E. M. Freeman, O. M. Leland, F. W. Peck.
- MISSISSIPPI:** D. C. Hull, J. R. Ricks, Susie V. Powell, R. S. Wilson.
- MISSOURI:** F. B. Mumford, A. J. Meyer, E. J. McCaustland, M. F. Miller, Louise Stanley, W. C. Ethridge.
- MONTANA:** Alfred Atkinson, F. B. Linfield, F. S. Cooley.
- NEBRASKA:** E. A. Burnett, W. H. Brokaw, O. J. Ferguson, Margaret S. Fedde, T. A. Kiesselbach.

- NEVADA: W. E. Clark, Robert Stewart, C. W. Creel, F. H. Sibley.
- NEW HAMPSHIRE: R. D. Hetzel, J. C. Kendall, F. W. Taylor, C. H. Crouch, Helen F. McLaughlin.
- NEW JERSEY: J. G. Lipman, E. H. Rockwell, W. S. Knowles.
- NEW MEXICO: H. L. Kent, Fabian Garcia, C. F. Monroe, R. W. Goddard.
- NEW YORK:
- Cornell*: Livingston Farrand, A. R. Mann, M. C. Burritt, Herman Diederichs, Martha Van Rensselaer.
- Geneva*: R. W. Thatcher, U. P. Hedrick.
- NORTH CAROLINA: W. C. Riddick, B. W. Kilgore, C. B. Williams, J. M. Gray, C. R. Hudson, Jane S. McKimmon, Maude E. Wallace.
- NORTH DAKOTA: J. L. Coulter, P. F. Trowbridge, G. W. Randlett, E. S. Keene, C. B. Waldron.
- OHIO (*College*): Alfred Vivian, H. C. Ramsower, E. A. Hitchcock, Faith R. Lanman, Marie Sayles, Minnie Price.
- (*Station*): C. G. Williams.
- OKLAHOMA: J. B. Eskridge, M. A. Beeson, C. T. Dowell, W. A. Conner, R. G. Tyler, W. R. Shelton, E. A. Miller.
- OREGON: W. J. Kerr.
- PENNSYLVANIA: J. M. Thomas, R. L. Watts, R. L. Sackett, Edith P. Chace, M. S. McDowell.
- RHODE ISLAND: Howard Edwards, B. L. Hartwell, A. E. Stene, G. E. Adams, R. L. Wales, Alice L. Edwards, W. E. Ranger, Z. W. Bliss, Charles Estes, P. A. Money, R. S. Burlingame, T. G. Mathewson.
- SOUTH CAROLINA: W. M. Riggs, H. W. Barre, F. H. H. Calhoun, Christine N. South, S. B. Earle, D. W. Watkins.
- SOUTH DAKOTA: W. E. Johnson, C. Larsen, J. W. Wilson, W. F. Kumlien.
- TENNESSEE: H. A. Morgan, C. A. Willson, C. A. Mooers, C. A. Keffer, Nellie Crooks, Margaret A. Ambrose, N. E. Fitzgerald.
- TEXAS: W. B. Bizzell, E. J. Kyle, F. C. Bolton, A. B. Connor, M. Helen Higgins, T. O. Walton.
- UTAH: E. G. Peterson, William Peterson R. J. Evans.
- VERMONT: J. L. Hills, Thomas Bradley, Lydia M. Potter, J. W. Votey, Bertha M. Terrill.
- VIRGINIA: J. A. Burruss, H. L. Price, A. W. Drinkard, Jr., J. R. Hutcheson, S. R. Pritchard, J. S. A. Johnson, D. S. Lancaster, Mrs. M. M. Davis.
- WASHINGTON: E. C. Johnson, S. B. Nelson.
- WEST VIRGINIA: E. B. Trotter, G. R. Lyman, H. G. Knight, N. T. Frame, C. R. Jones, C. H. Winkler, Rachel H. Colwell, A. H. Rapking.
- WISCONSIN: H. L. Russell, F. B. Morrison, K. L. Hatch.
- WYOMING: A. G. Crane, J. A. Hill, A. E. Bowman, Elizabeth J. McKittrick.

# **Constitution**

(As amended November 22, 1922)

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## **NAME**

This Association shall be called the Association of Land-Grant Colleges.

## **OBJECT**

The object of this Association shall be the consideration and discussion of all questions pertaining to the successful progress and administration of the institutions included in the Association, and to secure to that end mutual cooperation.

## **MEMBERSHIP**

(1) Every college established under the Act of Congress approved July 2, 1862, or receiving the benefits of the Act of Congress approved August 30, 1890, shall be eligible to membership in this Association, provided that any agricultural experiment station not now connected with one of the above named colleges, but receiving the benefits of the Act of Congress approved March 2, 1887, shall also be eligible to membership.

(2) Any institution a member of this Association in full standing may send any number of delegates to the annual convention of the Association.

(3) Delegates from other institutions engaged in educational or experimental work in the interest of agriculture or mechanic arts may, by a majority vote, be admitted to conventions of the Association with all privileges except the right to vote.

(4) In like manner, any person engaged or directly interested in agriculture or mechanic arts who shall attend any convention of this Association may be admitted to similar privileges.

## **SECTIONS**

(1) The Executive Body of the Association shall consist of the chief executive officer of each institution having membership in the Association, or a substitute duly appointed by him, and shall also include all members of the Executive Committee. The Executive Body shall be the legislative branch of the Association.

(2) Sections shall consist of the following: A section of agriculture; a section of engineering; a section of home economics; and such other sections as may from time to time be approved by the Executive Body.

The sections shall communicate their recommendations and reports to the general session which shall in turn report to the Executive Body.

The membership of the sections shall consist respectively of the directors, deans, or other administrative heads of these respective departments or divisions of the institutions having membership in the Association and of similar divisions of the United States Department of Agriculture and the Federal Bureau of Education.

#### MEETINGS

(1) This Association shall hold at least one meeting in every calendar year, to be designated as the annual convention of the Association. Special meetings may be held at other times, upon the call of the Executive Committee, for purposes to be specified in the call.

(2) The annual convention of the Association shall comprise one or more meetings of the executive body to which shall be referred all business of the convention requiring legislative action.

Meetings of the sections for the discussion of matters pertaining to their respective lines of work shall be provided for in the convention program.

General meetings of the convention shall be held as designated by the Executive Committee.

#### OFFICERS

(1) The officers of the Association shall consist of a president, vice-president, and secretary-treasurer, to be chosen by the Executive Body and to serve as the officers of such body.

(2) Each section shall elect its chairman and secretary.

(3) An Executive Committee of five members shall be chosen by the Executive Body, of which committee three members shall be chosen from the Executive Body and the remainder at large.

#### DUTIES OF OFFICERS

(1) The officers of the Association shall perform the duties which usually devolve upon their respective offices.

(2) The president shall deliver an address at the annual convention before the Association in general session.

(3) The Executive Committee shall determine the time and place of the annual conventions and other meetings of the Association, and shall, between such conventions and meetings, act for the Association in all matters of business. It shall issue its call for the annual conventions of the Association not less than sixty days before the date on which they are to be held, and for special meetings not less than ten days before such date. It shall be charged with the general arrangement and conduct of all meetings called by it. It shall designate the time and place of the convention. It shall present a well-prepared order of business, of subjects for discussion, and shall provide and arrange for the meetings of the several sections. The subjects provided for consideration by each section at any convention of the Association shall concentrate the deliberations of the sections upon not more than two lines of discussion, which lines, as far as possible, shall be related. Not more than one-third of the working time of any annual convention of the Association shall be confined to miscellaneous business.



**FINANCES**

At every annual convention the Association shall provide for obtaining the funds necessary for its legitimate expenses, and may, by appropriate action, call for contributions upon the several institutions eligible to membership; and no institution shall be entitled to representation or participation in the benefits of the Association unless such institution shall have made the designated contribution for the year previous to that in and for which such question of privilege shall arise, or shall have said payment remitted by the unanimous vote of the Executive Committee.

**AMENDMENTS**

This constitution may be amended at any regular convention of the Association by a two-thirds vote of the Executive Body, if the number present constitute a quorum of the membership: *Provided*, that notice of any proposed amendment, together with the full text thereof and the name of the mover, shall have been given at the next preceding annual convention and repeated in the call for the convention. Every such proposition of amendment shall be subject to modification or amendment in the same manner as other propositions, and the final vote on the adoption or rejection shall be taken by yeas and nays of the institutions then and there represented.

**RULES OF ORDER**

(1) The Executive Committee shall be charged with the order of business, subject to special action of the Association, and this committee may report at any time.

(2) All business or topics proposed for discussion and all resolutions submitted for consideration of the Association shall be read and then referred, without debate, to the Executive Committee, to be assigned positions on the program.

(3) Speakers invited to open discussion shall be entitled to twenty minutes each.

(4) In general discussions the ten-minute rule shall be enforced.

(5) No speaker shall be recognized a second time on any subject while any delegate who has not spoken desires to do so.

(6) The hours of meeting and adjournment adopted with the general program shall be closely observed, unless changed by a two-thirds vote of the delegates present.

(7) The presiding officer shall enforce the parliamentary rules usual in such assemblies and not inconsistent with the foregoing.

(8) Vacancies which may arise in the membership of standing committees by death, resignation, or separation from the Association of members shall be filled by the committees respectively.

# Proceedings of the Thirty-Sixth Annual Convention of the Association of Land-Grant Colleges

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## MINUTES OF THE GENERAL SESSIONS<sup>1</sup>

TUESDAY EVENING, NOVEMBER 21, 1922

The convention was called to order at 8 P. M. by the vice-president of the association, A. A. Potter of Indiana, who read telegrams from President Thomas D. Boyd of Louisiana State University, the president of the association, as follows:

BATON ROUGE, LA., November 16, 1922.

DR. R. A. PEARSON,  
Cosmos Club,  
Washington, D. C.

Sorry will not be with you next week. Was broken down by strenuous New England trip last summer. Tried to recuperate in southwest Virginia with only partial success. Afraid to risk another trip North at this season. Dean Potter has kindly consented to preside at convention.

THOMAS D. BOYD,  
*President.*

BATON ROUGE, LA., November 20, 1922.

DR. J. L. HILLS,  
Association of Land-Grant Colleges,  
New Willard Hotel, Washington, D. C.

Sincerely regret that circumstances beyond my control prevent my enjoying the happy privilege and the high honor of presiding at the annual convention of land-grant colleges. The program is excellent and I hope that all who have the good fortune to attend will derive much pleasure and profit from the convention.

THOMAS D. BOYD.

**THE VICE-PRESIDENT.** Those connected with the land-grant institutions have always been greatly pleased with the cooperative relations which are existing and have existed between these institutions and the United States Department of Agriculture. We are greatly honored this evening by having as our guest and speaker the Secretary of Agriculture. It gives me great pleasure to present to the delegates and guests of the Association of Land-Grant Colleges, Honorable Henry C. Wallace, Secretary of Agriculture.

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<sup>1</sup> All sessions of the convention were held at the New Willard Hotel.

## ADDRESS OF THE SECRETARY OF AGRICULTURE,

HON. HENRY C. WALLACE

Mr. President, ladies and gentlemen, members of the Association of Land-Grant Colleges, and guests: You have been here now for two days, and during that time you have come in contact with a great many of the people in the Department of Agriculture, and I am sure that they have made known to you the pleasure it is to them, and to all of us, to have you here with us.

Interested as we are together in promoting the agriculture of the nation, and cooperating as we are in so many different ways, it is a very great help to all of our people in the department to have the opportunity to form these personal contacts. It is so much easier to carry on co-operative work successfully when we come to know one another; and in that part of our work which it is necessary to carry on by correspondence, it is so much easier to do that intelligently when we can visualize the fellow at the other end of the line. So we feel that the personal contacts of this week are helpful to us and we trust they may be to you.

And we benefit in another direction. You come from the various States. You know the conditions in those States. You know the agriculture of those States. You bring to us State views and State conditions which it is very necessary for us to have if we are to cooperate with you to the best advantage, and to carry out the sort of work that the Department of Agriculture is expected to carry out. I think all of us who are interested in agricultural work of any sort have a keener appreciation of our responsibilities now than we ever had before. The experience through which agriculture has passed during the past two or three years of widespread depression has intensified our sense of responsibility in an unusual way, and I think it has energized our efforts, has given them new points of application.

I have talked with many of you in the two days you have been here. I have been interested in this, that, without regard to the particular State from which the person to whom I am talking may come, he tells me that the agricultural depression has been more severe in that State than in any other State of the Union. The fact of the matter is the depression has been general. It has hit some sections harder in one way and some harder in another, but from all we get reports of the stress and trouble through which the farmers have been passing.

I suppose that we in the Department of Agriculture have had a better opportunity to sense this depression in its nation-wide aspect, than people connected with any other activity of the government, or any other activity related to agriculture. We hear from every region, from every State, almost from every county and township. If you could read some of the appeals which come to us, you would agree with me that they are heart-rending—letters from women, letters from children, as well as letters from men.

One of the results of this depression has been to bring home to people who have not heretofore realized it our real dependence upon agriculture. In times past we have been in the habit of saying that the farmer is the backbone of the nation, and that a prosperous nation depends upon a pros-

perous agriculture, and have used similar expressions; but never before have we had such an illustration of the fundamental truth as during the past two years. As a result, I think that the people generally, people not in direct contact with agriculture, have a keener understanding of the national dependence upon agriculture, a keener appreciation of their own dependence upon a prosperous agriculture, than ever before.

Now, we have had that illustrated in many different ways. Congress, for example, in the past eighteen months has given more time, more study, more consideration, to agricultural matters than any Congress ever gave before in many times that length of time, and during that period Congress has striven through legislation to aid agriculture in a more sane and intelligent way than, I think, any Congress has ever undertaken to do before; because the condition was brought home to them in a more direct, pertinent way than ever before.

We see that people in business—not only in businesses dependent directly upon agriculture, such as farm implement manufacturers, but people in more distantly related business enterprises—have come to have a better understanding of their dependence upon agriculture; we see now, wherever we go, the desire upon the part of business people—of bankers, of people engaged in commerce of all sort—a real desire to help, so far as they can, in pulling agriculture out of the depression in which it has been for the past two years.

Now, before the war we had evidence of the interest of business people in agriculture. We had what we called the “back to the land” movement; we had “uplift” movements; we had the movement by city clubs to encourage the raising of more corn and more wheat and better hogs and better calves and more of them; but their approach to the matter now is quite different. Now they realize that their own personal interests are at stake, are inseparably connected with the interests of the farmer. And so we have, instead of that rather paternalistic spirit that we had before the war, an active spirit evidencing a desire to help because they have come to feel finally that their own interests depend upon getting agriculture once more upon a prosperous footing.

Well, all of that has been helpful, all of that is being helpful. The legislation that has been enacted by Congress has been helpful—not as much as some people had hoped, but distinctly helpful—both in encouraging the farmer and in checking, to some extent, the operation of economic forces which were working against him.

We have had an evidence also of the results of this depression, in what I think is perhaps an enlarged conception of our agricultural teaching. I have noticed with much interest the larger emphasis which is being put on the teaching of agricultural economics in various institutions. Only a few years ago the number of institutions which made their agricultural economic courses of importance was small. Now we see most agricultural colleges greatly strengthening their courses in economics. That is wise.

Knowing your interest in the Department of Agriculture I am going to speak to you briefly of what we have been trying to do during the past eighteen months, and since I have just spoken of economic work, I shall speak of that work in the Department.

As you know, the appropriation bill which went into effect July 1, 1921, combined the two Bureaus of Markets and of Crop Estimates, into <sup>9,</sup> one

bureau. The appropriation bill which went into effect July 1, 1922, added to that merger the Office of Farm Management.

Now we have brought those three bureaus—for the office has the rank of a bureau—together into what we call the Bureau of Agricultural Economics, because, like you, we realize the importance of emphasizing more strongly than we have in the past, the economic work of the Department. I think this is true, that both in the Department and in the colleges, in all of the agricultural agencies, the main emphasis up until very recent years has been put upon production, and perhaps properly so, but, as the result of experiences during and since the war, we can now see that, without impairing in any way our work along production lines, we should put greater emphasis upon work along economic lines; for, when all is said and done, you cannot have a permanently productive agriculture unless you have a prosperous agriculture. The farmers of the country have got average sense, they have the average ambition and desire to do well for themselves, and the young men, especially in this day, are not going to continue in farming unless they can see opportunities for advancement in a material way and in every way that are fairly comparable with the opportunities they can see elsewhere. Unless we can get our agriculture upon a fairly prosperous basis, one year with another, offering opportunities fairly comparable with the opportunities in other lines of endeavor, we may expect that our boys, our young men, will steadily drift from the farms into the cities; and I do not think any of us will blame them for doing that. In fact, I do not think we would have a very high opinion of a young man who, having the opportunity to choose, would not choose the course offering him the widest opportunity.

Now feeling that very strongly, I have put what emphasis I could upon the importance of strengthening the economic work of the Department, I have felt that we should give more attention to such matters as cost of production of various crops, business administration of the farm, marketing of crops, the factors that influence a profitable agriculture—profitable as to the individual farm, profitable as to the State, as to the region, and as to the United States at large. And, in doing that, we are serving directly the farmers of the United States, and through them the nation as a whole; for our whole national enterprise is based upon a continuing, wholesome, satisfying, prosperous agriculture.

In the work of the Bureau of Agricultural Economics we have been trying especially to strengthen our marketing work and our statistical work, as relates to crop estimates and livestock estimates. We have been trying to strengthen that phase of the work which takes a survey of conditions not only in our own country but of international conditions, trying to get ourselves in a position where we can inform our farmers of the competition which they may expect from farmers of other nations, trying to perfect arrangements by which we can bring to our farmers the sort of information that any one of them would want to have if he owned all of the farms of the United States and was seeking a successful market for the products of those farms. So we send men overseas, to the consuming nations, to study conditions which may influence markets for our crops. We are trying to gather up just the sort of information that the successful business man tries to gather for his own business.

We have been making some reorganization in the Department. A year ago last July we were authorized to create the offices of Director of Scientific Work and Director of Regulatory Work. It is believed that under a director of scientific work, the scientific work of the Department can be correlated, coordinated, much better than has been possible heretofore, when all of that sort of work had to come into the one office of the Secretary, who has plenty to do if he lost half of the work of the Department. The theory is that not only will the Director of Scientific Work coordinate the scientific work carried on in the Department proper, but that he will gradually, as he gets settled into the harness, endeavor to bring about a more complete cooperation in scientific research work in the Department and the various State experiment stations and colleges.

There are certain lines of scientific work which can better be done by a Federal agency having larger resources and the staff and equipment which an individual State can not expect to have. Other phases of scientific work can be done better in the States.

It is our hope through our office of Director of Scientific Work more and more to be able to cooperate with you as you would like to have us cooperate with you.

The Director of Regulatory Work will do for that phase of our work what the Director of Scientific Work does for his. In several of our bureaus regulatory work is being carried on by the bureau, necessarily so, because the regulatory work is being based upon the research work of that particular bureau. Also, in our regulatory work, we are cooperating both with the colleges and stations and with the departments of agriculture and the regulatory agencies set up in the different States. It is our hope that, with the director of the regulatory work giving his whole time to it, we shall be able to strengthen both our own work, and our cooperative relations with the State agencies.

At your last meeting, in New Orleans, Secretary Pugsley told you something of our plans for reorganizing the extension work, and since we have been here he has talked with your extension section, and I believe expects to meet you again. I shall not undertake to speak of the reorganization work in detail, further than to say this, that it contemplates the throwing of that extension work into two major fields, the field of projects, or *what* we shall "extend," if you will permit that expression, and the field of methods, or *how* we shall extend it.

The consideration of "what" and "how" necessarily involves a Department policy and in trying to formulate that policy there came about a development in which I think you will be interested. As we considered the question of what we should teach in that extension work and brought in representatives of the various bureaus to counsel with us over it, there gradually developed what we call commodity councils. Perhaps I can illustrate it better by speaking of the one to which we have given special attention throughout the last three months. We call it the cotton council. Almost every bureau in the Department, with the exception of the Forest Service, has something to do with cotton. There are the people in the Bureau of Plant Industry who are studying the varieties, the cultural methods, the various diseases of the cotton plant. There are people in the Bureau of Entomology who are studying the insect enemies. In the Bureau of Agricultural Economics they are studying cost of production,

marketing, and grading. There are people in almost every bureau who touch cotton in one way or another. And, as you know, the cotton problem has become rather acute, due to the spread of the boll weevil. The meeting of these representatives of our different bureaus have been most interesting and valuable, and out of those sessions of the cotton council we are evolving a definite departmental program as to cotton.

Now, the logical development has already occurred to you. Having settled upon a Department program as to cotton, the next step will be to meet with you people of the colleges in the various cotton States, and with other agricultural agencies, take to you the results of our own deliberations, ask your advice, counsel with you, and come together in agreement on a fairly definite extension policy as to cotton. Having come to that agreement, the next step also is perfectly obvious. We must bring into those councils those other agencies which have to do with cotton, the people who come in contact with cotton all along the line, the dealers, the bankers, the manufacturers, all who have a direct interest in cotton. Out of such meetings there ought to come a policy as to cotton which we can take with assurance to the farmers who grow cotton, and with the feeling that we are able to give to them a matured, thoroughly well-worked-out policy which they can follow with confidence that it is the best policy that the best minds who have anything to do with cotton have evolved up to the present time.

I feel that as we work on with these problems we shall gradually develop councils dealing with the various principal crops, councils dealing with the various livestock problems, councils dealing with all of the major problems of agriculture. I think that out of these councils will come regional councils dealing with the problems of agriculture in different regions. Our people have already commenced studying conditions and what we can do to help in that great northwest section where you have wheat as the main crop, and where there is agricultural distress. What can we do, cooperating with the agencies there, to make the Department of greater service to that section? That involves a study not only of the wheat crop but of all the crops of that section; it involves a study of the agriculture of that section. And if that is to be done satisfactorily it must be done not by the Department of Agriculture alone, not by any one of the agricultural agencies, but by cooperation of all of them—the Department, the colleges, the experiment stations, the State departments of agriculture and all of the State agencies, and by bringing in all of the people whose interests are related to and dependent on the agriculture of those regions.

The purpose of the Department, the ambition of the Department, is not to impose its own plan except as that plan commends itself as sound. The purpose is to step in as one of the workers with you people from the various States, to cooperate with you, to be guided by you as well as to help guide you, in so far as our information may be more complete than yours.

In a little conference that some of us had last night, once or twice it was suggested that we had come to a new period of the agriculture of the Nation, a new epoch if you please. Well, I am thoroughly convinced that that is true. I know that there is constant temptation on the part of people, especially those who like to speculate on the future, to treat each seemingly important change as if it marked the beginning of a new

era. But if you consider the changed conditions now as compared with twenty years ago, for example—I am speaking now not of the changed conditions brought about by the war alone, but of the changed conditions brought about in a perfectly normal way—I think you can see that the farmers of the next generation and those following, have very different problems from the farmers of the preceding generations. For example, we have come to the time when the profits from farming have got to come mostly from the normal, yearly operations of the farm. What I mean is that we can no longer depend for our profits upon the increase in the value of our lands. There was a time, and not many years ago, when the young man who had the disposition to work, who was healthy, vigorous, strong and had a good wife, and who could make enough of a payment (it was a small one) on a piece of land to get a toe-hold, and who was saved from severe misfortune of one sort or another could get ahead and after a while become well to do. He did not make much money year after year from farming operations, but he got his living out of the farm, and the growth of population made his farm more and more valuable until, five years ago, say, if he was a man of fifty or sixty years of age and he and his wife had come to a time when their children had set up for themselves and they thought they were entitled to take life a little easier, they could move to town, and rent the farm for enough to give them a fair living in town, or they could sell the farm and invest the money and get a fair living from the income. That time has gone by. I do not mean to say that there will not be some increase in the value of our land as our population grows. I do mean to say that the farming of the future has got to be on the basis of average yearly operations, that the profits of the farmer have got to come from what he grows and not from the increase in the value of his land. That presents to us, and especially to those of us who are now looking on, a problem very different from the problem which we older men met in our time.

Also, there have been changes brought about by the war; changes, for example, in railroad rates. We have had a substantial advance in our railroad rates. We have had some reduction on various products, but rates on agricultural products are still fifty or sixty percent higher than they were before the war. Now, of course, we are hoping that there will be some substantial decreases in these railroad rates, but it is perfectly evident that for some time to come they will be considerably higher than they were before the war, considerably higher than the rates on which our agriculture, especially in remote regions, was built up, and in some cases these rates are so high that they practically kill traffic in certain agricultural products. There must be a readjustment to meet that situation. That means that there will probably be a readjustment in eastern farming.

President Friday, speaking at noon—I suppose many of you heard him—spoke of their Michigan problem. Now, he is undertaking to meet that. Among other things, he says they have been growing 250,000 acres of alfalfa in Michigan, and that they expected to increase that to 2,000,000 acres; which means that they are not going to buy nearly as much alfalfa from the West; which means in turn that those people who are depending upon Michigan and other States to take their alfalfa have got to readjust their own production accordingly.



So we have many problems growing out of the war which are going to remain with us for some time and which will perhaps make necessary very considerable changes in our crops and markets.

Now, that does not mean that we should be discouraged. It should serve simply as a stimulus to those of us who are interested in the promotion of a sound agriculture to put forth even stronger efforts. I do not know how it is with you, but I suspect it is much as it is with the average business man. In the earlier periods of a business, when you are trying to build up, you are keyed up, you are full of creative enterprise, promoting that business all the time. After a while you get it on its feet, it comes easier, and you are no longer under the stress you were under in the beginning, and there is a constant temptation to lapse into a purely administrative attitude, a constant tendency to look after just what comes over your desk. I find that so in my work in the Department here. I find that the greatest temptation I have to resist is to just sag into that routine day's work where I will do what I have to do and no more than that. Now, that is a thing that all of us who have these responsibilities to agriculture have got to fight. We have got to take and maintain a creative attitude, we have got to take an affirmative attitude, we have got to take a constructive attitude, because upon us rests the responsibility of promoting a productive and a prosperous agriculture.

I want to speak of the fine cooperation and help that we have had from you people in the States. One of the most satisfactory of my experiences, since I have been Secretary of Agriculture, has been your willingness to respond to our calls for help, the willingness to counsel with us, the willingness to advise with us, the willingness to work with us. All of our Department people appreciate that spirit on your part, very much indeed, and we hope as time goes on we can work in even greater harmony and even greater cooperation than we have in the past.

Before I close I wish to say that I am authorized, in behalf of the President, to invite you to meet him at 12.30 o'clock on Thursday at the executive offices. Those of you who know the life of the President of the United States will understand that it is very full. He can not step aside to attend meetings such as this, and even when you go to see him he can do little more than to shake your hands. But he has expressed a desire to meet you, and shake hands with you, and will be most glad to see you.

A. C. TRUE, United States Department of Agriculture. I am sure that we all deeply regret the absence of the president of the association on this occasion, but we are very fortunate in having a worthy substitute in the person of the vice-president of the association. It is now my honor and great pleasure to present to you Dean A. A. Potter of the Schools of Engineering of Purdue University, Indiana, who will deliver an address as acting president of the association.

## ADDRESS OF THE VICE-PRESIDENT OF THE ASSOCIATION

## TENDENCIES AND PROBLEMS IN LAND-GRANT INSTITUTIONS

BY A. A. POTTER

Ten years ago, at the meeting of this association, the late Dr. Winthrop Ellsworth Stone in his presidential address, set forth the accomplishments of the land-grant institutions in the following words:

"The establishment of these institutions has brought the application of scientific principles into the commonest occupations; emphasized the democracy of education; established the status of tax-supported institutions of higher learning; and more than any other cause contributed to the development of the new education in America . . . The land-grant colleges . . . constitute the most unique, useful, appreciated, and popular group of educational institutions in the country."

There is no doubt of the fact that the land-grant institutions represent the most successful experiment in technical education. These institutions occupy a unique position in education and have developed on the part of the States a sense of responsibility for higher education and a realization that education is a developmental function in which the State and Nation must take an active part. The type of education which has been perfected in the land-grant institutions is concerned with the permanent welfare of our people. Agriculture and industry form the basis of national prosperity and are dependent largely upon technical education and technical research, the foundations for which were laid by the Morrill Land-Grant Act. Practically all of the leaders in agriculture have been and are being trained in these institutions. While formal instruction in engineering was first started in 1824 at the Rensselaer Polytechnic Institute and several of the oldest engineering schools are privately endowed, by far the largest number of engineers in the United States have been trained in land-grant institutions. At the present time more than 25,000 engineering students are being trained every year at these institutions.

The activities of the land-grant institutions include teaching, research, and extension. In the agricultural divisions of these institutions all the three activities are fairly well balanced, while in the engineering divisions teaching has always dominated research and extension.

Efficient instruction must find expression in the application of scientific research. Activity along research lines enables the teacher to keep in touch with the progress of his specialty while commanding the attention of his students and the respect of his associates. Agricultural education is based upon the researches in the agricultural experiment stations which create definite agricultural knowledge. It is hoped that the Federal and State governments will find it possible to make sufficient appropriations so that the field of agricultural research can be widened in the near future.

Federal aid for research in engineering along the lines laid down for agricultural experiment stations was first attempted in 1897. It was tried again in 1907. More active efforts to secure Federal aid for engineering experiment stations were again started in 1916, but up to date these have been unsuccessful. Those connected with the administration of the engineering divisions of land-grant institutions are recognizing that research is the basis of good teaching and are instrumental in establishing engineer-

ing experiment stations at these institutions. The 1921 report of the Committee on Engineering Experiment Stations of this association shows that about one-third of a million dollars is being spent annually on engineering research in land-grant institutions and that over three hundred bulletins have been published up to date.

The agricultural extension activities have been successful in carrying the benefits of resident instruction and research to those who on account of lack of time, preparation, or means are unable to avail themselves of the benefits of the formal instruction offered by the institutions. This type of public service is doing much good and is popular.

In several land-grant institutions, engineering extension activities have been fairly well developed to aid the industrial classes with their problems. The type of this service depends upon the location of the institution. Lectures, conferences, extension classes, exhibits, short courses, and publications are being utilized for the purpose of disseminating engineering knowledge. The training of the teachers for trade and vocational schools is another form of extension. In most cases the engineering extension work is of secondary grade, but when properly administered does not seem to affect the standards of collegiate instruction. It is desirable, when conditions permit, to limit the elementary type of engineering extension work to assisting secondary and trade schools in the training of workers for industry. This will enable the land-grant institution to devote more time and funds to service and instruction of the collegiate grade. The land-grant institutions should also take greater advantage of the Federal Vocational Education Act and should train most, if not all, of the teachers for trades and industries. In carrying on engineering extension activities, institutions must be constantly on guard not to encroach upon the field of the consulting engineer. Engineering advice intended to bring personal profit to the inquirer rather than general good to the community should be avoided if such information is within the province of the consulting engineer.

This association should place itself on record as favoring the rapid development of engineering experiment stations and engineering extension departments to properly balance the engineering activities of land-grant institutions.

While land-grant institutions are greatly contributing to the welfare of their States and of the Nation through the agencies of the experiment stations and extension departments, their greatest opportunity for service to society lies in connection with the training of the thousands of young men and women who are enrolled in these institutions. These institutions of learning rest upon the foundations of State and national beneficence and should be interested in developing men and women who are most useful to society.

The stability of society depends upon the prowess and qualities of the people. Are we giving sufficient attention to character training? While some nations claim that the thing we care for most in the United States of America is money, the truth is that there is no nation on earth which attaches so much value to character as we do in this country. Character has been defined as a bundle of habits. The teacher's example in this regard has a marked effect upon the student's character. A teacher who is sincere, accurate, conscientious, absolutely honest, industrious, and dependable will

inspire similar qualities on the part of his students. Since character can best be taught by example, are we selecting teachers who possess the highest qualities of character and who can inspire in their students the development of outstanding virtues? Would it not be desirable to require each teacher to spend some time in his classes upon discussions having a direct bearing upon character building? Formal lectures or sermons on such subjects are of little value, but short talks by teachers in connection with the subject of their specialty will make a lasting impression upon their students. In connection with such talks, use can be made of the outstanding personal qualities of great men and of experiences or incidences which tend to bring out the importance of correct habits and of proper ethics in dealing with our fellow men. The master teacher should have no difficulty in impressing his students with the fact that knowledge is of no value to a person unless he is trusted and respected by his fellow men. To what extent do we recognize the influence of a great teacher in the character building of our students? If our graduates are to go out from our institutions with sterling qualities of character and with capacity for unselfish service to society, they need to come into association with teachers who embody the same ideals in their lives.

Next to character building, society expects our institutions to train men and women who can think clearly and correctly. The land-grant institutions during the earlier years of their existence trained men to do things and stressed the value of practical information. Even now, are we not placing too much emphasis upon studies which lead to the greatest usefulness immediately after graduation instead of in the long run? Are we not paying too much attention in our curricula to quantity rather than to quality of performance? Are we developing memory at the expense of reasoning power? Are we not teaching too much? We are constantly adding to our curricula new subjects and our students are expecting to have courses for everything. Is not the acquisition of knowledge of secondary importance in education? Society needs men and women who can think independently and not as taught. Leaders in industry are usually not of the storage battery kind but of the motor type. Are we awakening the inventive genius of our undergraduates? Do not our curricula include even now too many informational courses and is it not a fact that we could develop greater self-reliance among our students if we limited our teaching to subjects which the student cannot acquire by his own efforts? Too few realize that the object of education is not to impart information, so that people will become depositories of knowledge, but to train the mind. A certain European professor used to tell his students that the university is a mental gymnasium and not a brain restaurant. Our students must be impressed with the fact that a well-trained mind can only be acquired by a process of self-development and can only be retained if one is constantly willing to exercise it.

To develop thinking men and women we must place a higher valuation upon good teaching and we must constantly strive to improve the quality and thoroughness of our instruction. The future of our educational institutions depends upon good teaching. We must not allow our teachers to engage in research, extension, or outside professional work to an extent that will reduce the time of preparation for their classes. The members of our teaching staffs must be impressed with the fact that they are

primarily teachers of engineering or of agriculture and not engineers or agronomists. The greatest asset of an institution of learning is its teachers and not its buildings or its equipment. It is a misfortune to education if outstanding teachers are transferred to administrative positions and our institutions should not sacrifice inspiring teachers for the sake of efficiency in administration. About ten years ago a superintendent of a middle western city graded the teachers of one of our prominent eastern universities in the same manner as he grades his own teachers: His markings showed that about 60 percent of the professors and instructors were too poor to keep, 25 percent were passably good, and only about 15 percent were excellent. What results would a similar test bring in the case of land-grant institutions? Are we giving sufficient attention to the technic of teaching? Do our instructors appreciate the difference between teaching and imparting information and have they the ability to develop their students by leading and not by driving? The relation between teacher and student should be founded not on fear but on mutual confidence and self respect. We need more great teachers of the type of Agassiz to build character and to popularize science. It is the duty of our institutions to improve the teaching power of their staffs and to make the salary of the outstanding teacher so attractive that he will not look to an administrative position as a promotion. What provisions are land-grant institutions making with reference to retiring pensions for members of their faculties who have given many years of service to education and research? A few of our institutions are on the Carnegie list, but the majority are not.

A way has never been found of acquiring learning without study, but observations show that few college students know how to study. Institutions are at fault if they fail to guide students in developing a proper mental attitude toward their studies, in improving their personal efficiency and in acquiring proper habits of study. Students should be aided in cultivating interest in their studies. A large percentage of failures among college students is due to the fact that they are not interested in the subjects they are studying. Interest is based upon apperception. The immature student often lacks imagination to discover interest in abstract matters, but can be interested if he can see the application of the subject he studies. Interest on the part of the learner is essential if he is to derive the greatest benefit from his course of study.

The most critical time in the career of our students is during their first year at college. Are our institutions allowing their students to be taught by immature instructors or are the teachers for our freshman students selected for their teaching ability, as well as for their power to interest and to enthuse their students? Are we guiding our students so that they do not lose their sense of proportion between studies and student affairs, or are we allowing education to be subordinated to the so-called activities?

Society expects our educational institutions to develop thinking men and women, who possess not only outstanding qualities of character, but also superior personal traits. Educational institutions, in nearly all cases, rate students only on academic performance and the grades given are only a measure of brains and application. This system of rating is not a check of the student's personal, moral, or social traits and does not fully show the effect of the course of study upon the development of a student. Per-

sonnel ratings when added to the academic ratings are of value in encouraging self-analysis on the part of a student and are helpful in discovering the student's talents. Carefully kept personnel records are also helpful in recommending former students to prospective employers.

Are we striving to keep each student in our institutions at his highest level of achievement, are we giving him opportunity to develop in proportion to his capacity, or are we satisfied to have a uniform output without regard to the abilities and talents of the individual? Are we gaging our instruction to the reach of each student or are we setting up artificial standards which disregard the differences in the capacities of human beings for output? Are we offering sufficient incentives for competition in scholarship or are we setting tasks for the average in the group and allowing those at both ends to suffer? Are we not working the exceptional student below his capacity, while discouraging the slow student? The problem of the exceptional student merits careful consideration. Greater aid should also be given to the slow but earnest students. Our institutions must have as their purpose the elevation rather than the discouragement of students and the human factor in higher education should receive our most painstaking investigation.

Mankind has passed through several epochs. The age of fire, the use of bow and arrow, domestication of animals, manufacture of iron, and the written alphabet. Our own time has been designated as the era of manufactured power or the era of the engineer. Are we not now coming to the "era of man" when greater attention than ever before will be paid to the human element in education as well as in industry?

The men whom we are training at our land-grant institutions are becoming concerned to an increasing extent with human problems and with the broader questions of public life. The duties and responsibilities of our graduates are constantly widening. Many of our graduates will become directors of men and will be expected to have knowledge not only of materials, methods and machines, but also of men. In industry they will often stand as the intermediary between employers and employees and will be responsible for the harmonious working of the agencies of capital and labor. The future of industry depends upon leaders who have not only technical knowledge, but also breadth of view, understanding of human problems, courage and capacity to bring out the individual in industry, so that our social structure remains intact.

It is very doubtful as to whether we can train leaders to meet the increasingly complicated problems of industry without either advancing our entrance requirements or lengthening the course of study to five or six years. While it is undesirable to standardize education for different institutions, the time is now ripe for this association to make a careful investigation in order to determine as to whether our institutions should provide additional training for those who are to be the future leaders in industry and in the scientific professions.

A number of deans of engineering in the upper Mississippi valley and eastern Missouri valley met in the spring of 1922 and drew up resolutions favoring an advance in engineering education by providing five years of collegiate training; the first four years to lead to a bachelor's degree and the fifth year to lead to an advanced degree in engineering. There is a marked agreement among engineering educators that we must establish a

higher professional status for engineering education, but all realize that this should be accomplished without limiting or handicapping the rank and file of engineering students who accomplish so much in life, as a result of their present four-year course. Experience has shown that it is worth while for the physician and the lawyer to devote more than four years in preparation for his life work. Is the engineer or the agriculturist in less need of such training?

Even if the development of the longer course is not practical at present, should not the stronger of our institutions give greater attention to graduate study in order to train teachers and scholarly experts?

Final conclusions concerning the wisdom of lengthening the courses of study or of developing graduate instruction can not be established unless a careful study is made of the market for the students we train. Would it not be well for this association to cooperate with other agencies interested in the product of our institutions in order to make a careful survey of the demand for our graduates?

In general the future of the land-grant institutions depends upon adequate financial support. These institutions can not train large numbers of men for leadership, create new knowledge or carry on extension activities of value to the country unless they receive better support for their work. The taxpayers are of the opinion that appropriations for our institutions cause taxes to be high, whereas the truth is that there is no land-grant college in existence which receives an appropriation as large as one dollar per person of State population. Among the important functions of this association and of the administrative officers of land-grant institutions is to educate the public so that there is no misrepresentation about the relation between the appropriations for land-grant institutions and the general tax burden.

The above are a few of the important problems which are confronting all land-grant institutions and in connection with the solution of which this association can be most helpful. As pioneers and leaders in technical education, the land-grant institutions should constantly strive to improve the quality of their product, in order that they may be in a position to perform the greatest service to this country and to humanity.

**THE VICE-PRESIDENT.** It gives me pleasure to introduce Hon. James R. Howard, President of the American Farm Bureau Federation.

#### ADDRESS OF THE PRESIDENT OF THE AMERICAN FARM BUREAU FEDERATION

BY HON. JAMES R. HOWARD

It is a rare privilege for one whose whole life and thought has been spent within the confines of his own farm and in his farm community to meet this distinguished group. I am persuaded, however, that there is no problem or condition germane to our national life or national community which does not pertain on every farm and in every local community. I am sure that on that Iowa farm I met continuously, in greater or less degree, every problem of finance and transportation and marketing and economics and sociology that pertains in every other spot or place.

It is not necessary for me to tell many of you about our present agricultural distress. You all have been aware of it during this its third year.

We have been having some sunshine reports recently regarding the return of agricultural prosperity. Perhaps I should not call them sunshine reports, but rather Jack-o'-lantern reports, for the prosperity has not yet been realized.

When I left our Chicago office Saturday night I was told that the probability that the price level reports for September would show the farm prices to be one point above 1921, while the other commodities on the list would show an advance of 25 points above. If this advance tip materializes it will indicate, in a graphic way, that the distress of the farmer is greater today than a year ago because the farmer must buy largely of other commodities.

I am perfectly aware that you, in your scholastic positions, can do little to ameliorate this distress. I have heard it said that the proper time to begin the education of a youth was twenty-five years before the child was born. Applying the same principle, the relief measures for the present situation should have been put in operation years ago. Following the same reasoning, now is the time to consider our whole general and economic situation with the view of avoiding, if possible, a repetition. It is in this work that it seems to me you hold a responsible position.

May I trace briefly a few well-known facts regarding our national development. The beginning of the nineteenth century found us a nation with 5,000,000 people along the Atlantic seaboard with a vanguard looking westward across the Alleghanies. An undeveloped empire, the richest in the world, was in the foreground. The end of the century found us a nation of 75,000,000 people. Out of the unexplored wilderness that empire had materialized. The magic of the century had brought the steamship, the cotton gin, the railroad, the telegraph, the automobile. Science and mechanics defied time and space. It was the cycle of the drama of the ages, and the stage was the undeveloped prairies of the West, which, with the falling of the curtain of the century, were sending their products to the factories, the cities, and the ends of the earth.

During the century we had a very definite national policy, whether we so recognized it or not. It was the policy of land settlement. The prairies were to be subdued and made productive. To bring this about, railroads were built, often subsidized by government land-grants, always anticipating the oncoming settler. The settler himself was likewise subsidized through the homestead act and the preemption privilege. The surplus of the new farmsteads helped in the development of mines and building of factories. They furnished the tonnage which the ships carried to the ends of the earth and exchanged for products of other lands or for needed gold to meet a rapidly expanding industrial demand.

All these things brought out a marvelous advancement in modes and standards of living. That which spelled luxury for our grandparents would scarce now suffice for those of us of most lowly estate. I need not trace by decades or numbers the advance of the settler. What I want to say is this, that the close of the century found under cultivation practically the last acre of available productive land.

This passing of the public domain marked the end of one era of our national development and the beginning of a new one. The passing age was one of pioneering. The oncoming settler would pause awhile in whatever community he came to, break up a few acres of the virgin prairie,



and pass on, making way for the oncoming hordes behind. Every community—in fact almost every farm—was a roadhouse where families paused but for a night ere they carried their quest farther.

As with agriculture, so with business. Banks were established, stocks of merchandise assembled, factories and railroads built more as an experiment or an exploitation than with a studied view of meeting a definite and permanent need. The new era which was ushered in with the passing of the public domain, and on whose threshold we now are, is to be a period of permanent development, of adaptation, of coordination, of co-operation. When the farmer comes now into a new community it is with a view of finding a permanent home, because there are no more undeveloped lands beyond. He studies the community into which he comes. He wants to know about its schools, its churches, its roads, the local town, the neighbors. The merchant, or the banker, or the manufacturer carefully blue-prints the town or community before venturing upon any enterprise.

Progress may come as unceasingly in the new era as in the old, but it must be a different progress, and the problems of the coming years must be carefully studied. History indicates that civilization always hangs in the balance, and the welfare of the unborn generations depends largely upon the issue of some of our present day problems.

Land-grant colleges were brought into being at the close of the second third of the past century. Their work, so far as agriculture is concerned, seems to have followed closely in line with our general national policy of land development and agricultural production. It is not fair to criticize the work of the administrators of these institutions who have so well fulfilled their mission. If any criticism were due it would be that the policies of your institutions have been directed too much along the line of increased production and more efficient production and too little in the forecasting of future needs from present conditions. However, to be fair, we must admit that it probably would have been impossible to have foreseen many of the things which now trouble us.

Neither do I want to be on record as indicating that an ample production is not a good thing. Many people believe the farmer has overproduced. We certainly have relatively overproduced. That is, industrial production and transportation production have not kept pace with agricultural production. As a result things are out of balance. I would rather say that industry and transportation have underproduced than to say that the farmer has overproduced. I do say, however, that the time has come when there must be a balanced production which, if not brought about by some regulation, will be forced soon by economic laws. It would be infinitely better if there could be in all lines a surplus production, because it is only through surplus production that standards of living are ever advanced, and he who, whether capitalist or laborer, wilfully limits production depresses just that much the advancement of the human race.

I have recently examined the curricula of a number of your institutions. I am thoroughly aware that the diversity of agriculture and industry in the various States, together with your varying resources, would make any uniformity impossible and that any suggestion which might be made by an outsider must necessarily be very general. I am further aware that some of you have been recently revising your lines of teaching. It so chances that my own small education was not acquired at a land-grant

college, which I have always regretted. To me there is as much mental discipline and personal refinement in the study of corn or cattle as in a dead and forgotten language and your courses are more truly "liberal arts" courses than any other I know of.

However, it seems from looking over a number of catalogs that too much attention is given relatively to the study of material subjects and too little to those dealing with human relationship. I chance to have three boys who have arrived at, or almost at, the college age. In spite of the fact that the unskilled laborer is at a premium in earning power over the educated man, I want those boys to go through college. In spite of the fact that agriculture is at low ebb, I have faith enough in the future to hope that some of them at least will be farmers. What would I like to have those boys learn at college? My own answer to that question takes me immediately to some of the problems which have come to us in this new era of the adjustment of human relationships and these are the problems which are proving vexatious to the farmer. Let me mention two or three of them.

If we produce a surplus on our farms we must market that surplus; and the first step in marketing is transportation. The breaking down of transportation is one of the great burdens which the American farmer is today compelled to bear. We complain bitterly about railroad rates, and we have reason to complain. We are looking to Congress to bring us relief. But we will look in vain, for the laws of economics supersede any statutory enactment. It is my own conviction that the solution of the railroad problem lies in a more economic handling of present facilities, the continual improvement of equipment and operation, in such legislation as will permit the exercise of personal initiative with only that degree of government supervision which insures an honest service to the public, and ultimately in electrification. That is only a personal opinion. It is not worth much, because I have not been trained to think along transportation lines. I should have been so trained in order to be a good and successful farmer, and if my sons succeed as farmers, I would want them to have not a technical training in transportation, but that rudimentary instruction which would give them an insight and enable them later in life to think and act clearly on such subjects. And why should they not, when one-eighth of the gross income of all the farms in America is paid out by the farmer on his outgoing product.

Not only should the farmer know something of railroads but also he should know what his relation is to marine shipment and highway development. With regard to the latter I have been puzzling my head lately to know whether I had better buy a span of mules and a wagon, or a truck, or a tractor and trailer to move the material for a new house from my local station to my farm this coming summer. Some experimental work at some good college would help me.

Following transportation the farmer needs to know more of marketing than he does, and it is as much your business to teach the farmer how to intelligently market his crop as it is to teach him how to produce it. I quote a former Secretary of Agriculture, who said, "Marketing is the other half of agriculture." He was absolutely right. And yet I find marketing in most of your courses given minor consideration, if any. Not only should you teach the mechanics of marketing, but you should teach also the proper

interpretation of market reports and stimulate the study of world conditions.

The third thing which I have in mind as a necessary part of any well balanced agricultural course is financing. For the past two or three years we have heard a great deal about agricultural credit and many farmers are demanding more and more credit. It is possible that some of them need credit. It is more likely that many of them have already had too much credit and are not properly differentiating between capital and credit. I have asked a number of farmers recently to define the terms capital, credit, and money, and have been much interested in their replies. If I were a school teacher I would propound those same questions to this group of men. But since I am not, you stand in no danger of embarrassment. But the farmer of the future should be trained to know the need, the uses, and the abuses of this important agency.

I would not have you take it that these generalities of transportation, marketing, and financing are the only subjects outside of the technical or scientific subjects in your courses which should be more emphasized than they are. I would not for one minute advocate the teaching of highly technical or scientific economics. But the intelligent farmer of the future must be trained in those subjects which bring him into human relationship with the rest of the world. And in emphasizing the necessity for this, I am thinking farther than the need of the individual on his own farm. Your students and graduates become leaders in their respective communities and you are building American citizenship. What this country needs today more than any other one thing, and will need for years to come, is clear and sane thinking upon the farms of America, and I can not too strongly emphasize your responsibility. The weal or woe of a democracy lies in the will of the majority, and the future welfare of this nation rests largely—yes, more than largely, almost entirely—upon a clear thinking agricultural population, upon men interested in their respective communities. We speak frequently of the deplorable increase in agricultural tenantry. It is regrettable. But the farm tenant is a better and safer citizen than the town tenant, because the farm tenant has a vested property right, if not in the soil then in the crop, and in the equipment and the livestock on the farm, while the town tenant has none.

I trust you will not take the foregoing as too critical. It would be entirely improper if I did not voice a personal appreciation of my own obligation and that of every other farmer to the splendid work which the land-grant colleges have done in the past. Your experiment stations have done tremendous things for the farmer, and their work has but started. I can not too strongly emphasize the importance of this work or urge on our Congress and our various State legislatures the need of sufficient funds to make it more beneficial. The work of your extension departments in carrying to the individual farmer, through the county agent, and interpreting to him on his own farm the work of the experiment stations and the agricultural colleges is a very great boon. In fact, the extension workers take information which is largely static and interpret it to the farmer on his own farms as dynamic information. I have no hesitancy in saying that, as a result largely of the work of the land-grant colleges and the Department of Agriculture, farming is the most efficient of all our various classes of American industry. I recall that Herbert Hoover, when a mem-

ber of the American Engineers' Association, appointed a committee to study American industries. This committee, after an exhaustive study of six industries, made a report that the average of the six was less than 50 percent efficient. Compared with this the average farmer wears the purple ribbon.

Now one or two general observations. The governor of one of your States told me last week that he believes the farmers of his State should produce on their own farms practically all their family sustenance and necessities. Many people have voiced that same thought. My own mother tells me that when she was a girl they carded and spun and wove the wool from their own sheep. I well recall that as a youngster our own clothing was manufactured at home from blue denim and jeans and hickory shirting which we bought by the bolt. We had a sewing woman who came two weeks every spring and two weeks every fall to help with that particular work. Later on my father traded a buckskin pony for a sewing machine and the sewing woman was then used only one week each fall and spring. We strained our milk into shallow pans and skimmed it and made the butter at home and traded the surplus for other commodities at the local store. My mother had one or two helpers in the house the year around, which cost two dollars per week. There has not been a churn on my own farm for fifteen years and there is not likely to be for fifteen years to come, because my wife can not get help, even to do the washing, for less than four dollars a day.

It is from necessity that we have passed from a self-sustaining to a commercial agriculture. To go back to that self-sustaining agriculture would mean either to lower the standard of living upon the farms of this country or to decrease production to that degree which must depopulate our cities and greatly disturb our industries. The wheels of progress run forward and not backward.

I referred in the beginning of this discussion to the achievements of the nineteenth century. The two decades of the twentieth century have far eclipsed any of the achievements of the nineteenth. Four great national industries have developed within twenty years. The automobile, the moving picture, the chemical industry, the aeroplane, and the fifth, radio, is in process of rapid development, holding tremendous possibilities for the future. So rapidly are we moving that we can not properly sense our progress.

The forces, however, which have made for this great mechanical and scientific development were not new forces. They were potentially present in the days of the cave man. It merely remained for the genius of the nineteenth and twentieth centuries to develop them and utilize them for the benefit of mankind. There were other forces, aside from mechanical or natural forces, which have also been existent from the beginning of time—forces which are just as evident as those of nature. They have been recognized much longer but too little utilized and developed. I refer to the laws of economics or, if you please, human relationship. The problem of the new era is to develop these laws and to properly coordinate them in our everyday lives. The difficulty lies in the fact that men do not stay fixed as machines do. But there is much hope in our present day situation that there may be in years to come, a proper coordination and

cooperation of all men everywhere. It is a part of your work and mine to speed this day of good will and general understanding.

#### ANNOUNCEMENT REGARDING THE WORLD'S DAIRY CONGRESS

H. E. VAN NORMAN, Secretary of the International Dairy Congress, on request, made the following announcement: As the result of a communication from our State Department to the Department of Agriculture two years ago, there was started a movement for the holding in this country in October of next year of a world's dairy congress. The President of the United States, by authority of Congress, has invited the nations of the world to participate.

The program is being developed to serve four great interests: First, those who are interested in science and education. Science has brought to our industries its knowledge of feeding, bacteriology, and the control of the processes of the dairy industry. The second department is for those who are interested in this great industry from the standpoint of business. There never was a time when the dairy industry and all those who make a living from the cow or its products, needed to understand these great laws of business and economics as they do today. The third department of the program is for those who are interested in the industry from the standpoint of the laws relating to it—standards, adulteration, epidemic control, and sanitation. The fourth department is for those who are interested in the dairy industry from the standpoint of its relation to health. The war has brought out, and science is revealing to us, the fact that from 20 to 30 percent of our great, growing young people, are subnormal because of our ignorance of how to feed them, and dairy products are an essential part of that feeding problem. We hope in this congress to bring out the recent progress in this department, as well as in the other lines.

The committee of management invites the cooperation of the educational agencies of this country to the end that we may have the best program that it is possible to make, and that we may render the largest service to this essential part of our activities.

#### REPORT OF THE EXECUTIVE COMMITTEE

R. A. PEARSON, President of Iowa State College. The Executive Committee has held two special meetings during the past year. The essential features of its work have been set forth in two bulletins (February, No. 7; October, No. 8) which have been mailed to the presidents, deans, directors and home economics heads of all land-grant institutions.

*Conferences.*—The committee has held several conferences during the year with President Harding, with the Secretary of Agriculture, the Secretary of War, members of Congress, representatives of the Bureau of Education, with General Pershing, General Lassiter, Colonel Morrow, and Colonel Gleaves of the War Department, with many officers of the United States Department of Agriculture and with the officers of the Bureau of the Budget.

*Hearings.*—Two hearings on the Purnell bill were held, one in January and one in February.

*Extension.*—Much attention has been given to the extension situation, particularly in reference to conferences and county-agent activities. All this was set forth in one of the bulletins issued by the committee.

*Massachusetts Suit in Supreme Court.*—The committee calls the attention to a situation of extreme importance that may arise in connection with the suit which has been brought by the State of Massachusetts to restrain the Secretary of the Treasury of the United States from making payments to the States under the Sheppard-Towner bill, popularly known as the maternity bill. This suit may involve important activities, which have been provided for under other legislation, and which are being carried on now by the land-grant institutions. The matter is receiving careful attention.

*Cooperative Relations.*—The Executive Committee feels that there may well be a redefinition of the respective fields of work of the land-grant colleges, and the State departments of agriculture, in respect to cooperative relations, one with the other, and either one with the United States Department of Agriculture. This is an opportune time to bring the matter up, in view of the reorganization that is taking place in the Department of Agriculture.

*Annual Convention.*—The committee again raises the question as to what should be the policy of this association in reference to places for the annual meetings. Should we continue to move about from city to city, year by year, as we have been doing, or should we adopt a permanent policy? The National Association of State Universities, this year meeting here, adopted the permanent policy of meeting in Chicago each year, beginning with their meeting next year. Should our association continue to wander from place to place? It has been suggested that we might do well to hold a meeting in Washington every second year, and in the alternate years at various other places throughout the country. A third proposition which has been made is that we should hold all meetings in Washington, on account of the many contacts with the governmental departments and offices which we must have from time to time.

Further report will be submitted later. See pp. 95-96.

The report of the treasurer was presented by J. L. Hills of Vermont, as follows:

#### REPORT OF THE TREASURER

November 8, 1921 to November 21, 1922

##### RECEIPTS

To balance on hand New Orleans meeting .....	\$ 38.80
To 45 dues at \$75 .....	\$3,375.00
2 dues at \$55 .....	110.00
2 dues at \$35 .....	70.00
4 dues at \$20 .....	80.00
	<hr/> 3,635.00
To correct error in payment check 654 .....	.14
	<hr/> \$3,673.94
Disbursements as per statement .....	3,465.89
	<hr/>
Cash on hand November 2, 1922 .....	\$ 208.05

## DISBURSEMENTS

Executive committee .....	\$ 871.23
Extension committee .....	35.00
Special committee hearing Purnell Bill .....	405.48
Engineering Experiment Station Record .....	105.31
Secretary-treasurer's office .....	110.70
Proceedings and bulletins (printing, editing, postage, expressage, programs, badges, etc.) .....	1,838.17
American Council of Education dues .....	100.00
	<hr/>
	\$3,465.89

## ASSETS

Cash on hand November 21, 1922 .....	\$ 208.05
Certificate of deposit (July 15, 1921) .....	1,500.00
Interest at 5 percent to November 15, 1922 .....	100.00
Liberty Bonds (third issue) par value .....	2,000.00
Coupons 7, 8, 9 (due September 15, 1922) .....	127.50
	<hr/>
	\$3,935.55

The report of the committee appointed by the presiding officer to audit the report of the treasurer was as follows:

## REPORT OF THE AUDITING COMMITTEE

The auditing committee has examined the accounts of the treasurer and finds the same to be correct. All vouchers properly approved and receipted have been found on file. It also finds a bank balance, as stated, of \$208.05 and finds in the treasurer's hands an affidavit of the comptroller of the University of Vermont, dated November 15, 1922, to the effect that he holds in behalf of the treasurer, in a safety deposit vault rented by the university, two converted Liberty Bonds, third issue, Numbers 785070 and 785071, for one thousand dollars (\$1,000) each, with coupons 7 to 21 inclusive attached to each, and a certificate of deposit, Number 1445, of the Howard National Bank for fifteen hundred dollars (\$1,500), dated July 15, 1921, bearing simple interest at the rate of 5 percent per annum.

FRANK B. TROTTER,  
P. F. TROWBRIDGE,  
E. A. HITCHCOCK,

*Auditing committee.*

WEDNESDAY EVENING, NOVEMBER 22, 1922

The convention was called to order at 8 P. M. by the vice-president.

THE VICE-PRESIDENT. The meeting this evening will be devoted to a symposium on agricultural education and research in foreign countries, and the first speaker will be G. F. Warren of New York State College of Agriculture, who will speak on the general subject of agricultural economics in Europe.

## AGRICULTURAL ECONOMICS IN EUROPE

BY G. F. WARREN

I was sent to Europe last summer by the United States Department of Agriculture to study the agricultural situation there. The subjects which the department was particularly interested in were competition with and demand for American farm products. My work was, therefore, more with farmers and business concerns and government buying agencies than with colleges.

Before the war the agricultural colleges and other government agencies in Europe, as well as those in the United States, devoted little attention to economic questions. Their work was in a large measure biological. Their interests centered in the problems of providing conditions of comfort for plants and animals so that these would be happy and fruitful. Very important results were attained, but while the scientific facts which were valuable for plant and animal production received considerable attention, conditions were developing on farms which made the population discontented. In eastern Europe, the condition of many peasants on large estates approximated that of slavery. A generation ago Denmark took steps to break up large estates, but further east and south there was a condition of great unrest on the farms. This was accentuated by the contrast with the improved conditions of city workers. Farm conditions were improving, but improved too slowly.

While the agricultural scientists were devoting their time to plants and animals, the economists were largely engaged on the problem of making conditions favorable for industrial workers. The phenomenal growth of industries made the economic problems of cities paramount. Good national economy was sometimes taken to mean good conditions for city workers. The many years of cheapening food supply, coupled with industrial development, improved the conditions of industrial workers by leaps and bounds. Under the favorable economic conditions, the population multiplied even more rapidly than did the plants and animals grown under the care of the agricultural scientists. Gradually food prices began to rise and the period of the high cost of living developed. Laborers and many educated men believed this to be due to the iniquities of the farmers and the middlemen.

The dissatisfaction of the peasants, because of the estate method of operation, and dissatisfaction of laborers, because of the rise in food prices, were basic causes that played a very large part in the outbreak of the World War. At bottom the World War was largely a food and population question.

During and since the war two contending forces have been at work, one attempting to provide cheap food by price-fixing and the other arbitrary means, the other attempting to solve the problems of agriculture. In Germany, last year, two-sevenths of the wheat, oats, barley and rye were requisitioned from the farmers at a fixed price, which was about one-third of the world price. This amount was about equal to the necessary imports. The government then controlled a quantity of grain at one-third of the world price and had to purchase an equal quantity at the world price. This made it possible to sell it at two-thirds of the world price. The farmer was free to sell his remaining grain to any buyer, but since the



government was willing to sell at two-thirds of the world price and since export was prohibited, the farmer could only get about two-thirds of the world price. This general system is being continued. Price-fixing for farm products by direct or indirect means in middle and eastern Europe is starting on its ninth year. Wheat for export from Roumania last year was requisitioned at about thirty cents per bushel. Why do they not stop interfering with the freedom of trade? For the same reason that we have interfered with the freedom of trade in coal—because they fear to stop. They fear that there is something even worse than price-fixing.

We hear little of the farmer's side of the story. The government and newspapers commonly represent the cities. There is, however, a deep current of resentment at the restrictions. The farming regions are opposed to the radical labor views. The dissatisfaction in southern Germany is in part an agricultural question. One of the reasons for the demand for cost of production studies is to have these data as an argument against price-fixing. Personally, I do not believe that cost-of-production studies are of great value in showing whether or not farmers are getting more or less than their share of the good things of life. Movements of population are more significant. But in all countries cost of production has been turned to as a defence against the arbitrary price-fixer.

In England, there is an Institute of Research in Agricultural Economics at Oxford. Mr. C. S. Orwin and Mr. A. W. Ashby are in charge of this work. They are doing a considerable amount of cost accounting, but are not confining their work to this field. We find discussions at various meetings on such subjects as, "The Value of Economic Study in Agricultural Education and Farm Management," "Prices of Farm Products," "The Training of the Clergy in Social Leadership." The school of rural economy at Oxford merely means school of agriculture. It has about 150 students.

In Denmark, there is a Bureau of Agricultural Economics that compiles the results of cost accounts. The cost accounting is conducted in the same manner as the cow-testing work. Farmers' associations hire accountants and pay one-half the salary and the State pays the other half. Some of these associations send the results to the bureau for tabulation and some do not. In 1921, there were 40 such associations and 160 accountants keeping accounts on about 1,500 farms. The work is primarily to help farmers to farm more efficiently, but the price agitation has been a factor in its development.

In Czecho-Slovakia, Professor Brdlik, professor of economics at the University of Prague, is in charge of the Institute for Bookkeeping and Farm Management. About 1,500 farmers report to this office. Work has been done for many years, but has been stimulated by price agitation and by income taxation.

While in Denmark, I noted a machinery test that might be of interest to those who are studying agricultural engineering. Professor Christensen of the agricultural college<sup>1</sup> is in charge of this work. For a small fee, any

<sup>1</sup> Note that I have translated "agricultural high school" as "agricultural college." The agricultural high school at Copenhagen admits some students who have had considerably less than the equivalent of graduation from an American high school and admits some who have had more than the equivalent of high school graduation here. I think that it may be compared with an American agricultural college that is somewhat below the general standard in entrance requirements.

manufacturer may have the draft and other characteristics of his machine officially tested.

One result of financial inflation has been a stimulus to cooperation. When financial inflation takes place, prices rise rapidly. The buyer who holds his product owns it when it is worth more. Farmers see their products rise in price as they pass through the channels of trade, and like almost everyone else, they attribute this rise to the middleman system, whereas it is largely due to financial inflation. This is not the only cause but it is a large factor in the increase in cooperative associations. Needless to say, when deflation takes place, the longer ownership is retained, the greater the loss, hence the severe test that deflation makes on cooperative associations, as well as on other middlemen.

Farm prices in all of the allied and neutral countries of Europe lagged behind those of the United States, probably for the same reason that retail prices lagged here. Prices did not drop until the crops of 1921 were produced. The farmers exerted themselves under the stimulus of the highest prices ever known. This fact, together with the enormous holdings by the governments of war-time foods delayed the adjustment in Europe and in the United States. Probably a material part of the reduced production in Europe this year was due to the slackening efforts of farmers. In the countries of middle and eastern Europe, where deflation is still taking place, all industry is attempting to operate at high pressure. In middle and eastern Europe the continued inflation stimulates full employment. Where inflation is taking place, wages lag and it, therefore, pays to hire labor. A second profit is made from the fact that the finished product is sold when prices are at a still higher level. There is less unemployment in Germany than before the war. This is not a symptom of health but is a result of the continued inflation and continued approach toward bankruptcy.

In general, agriculture is going back to pre-war conditions, but not to the identical pre-war status. Before the war England produced all of the finest grades of beef and many other luxuries for the English cities. The lower grades of products were shipped in. England is going back to grass just as quickly as she can get there. The policy of prohibiting the importing of cattle to be fattened on English pastures is being continued as before the war. This is done under the guise of sanitation, but is an extreme protective policy. Canadian cattle are kept out ostensibly because of the foot and mouth disease. Canada has never had foot and mouth disease, whereas England has it frequently. The almost perfect climate that allows nine months of pasture, makes cattle and grass the logical type of farming for much of England. Some persons have argued that by growing wheat more people could be fed, but it seems almost a shame to grow wheat on such excellent pasture land. The cattle policy is also best in case of war, because cattle represent stored-up crops of past years. In case of war, this reserve food supply can be eaten and the pastures which are in excellent condition can be turned to grain by using the accumulated fertility of the pasture soils.

The agriculture of the neutral countries was badly upset by the war. At first thought it would seem that the neutral countries must have become very rich as a result of the war, but these countries ceased to keep up their buildings and other permanent things. They turned their attention to pro-

ducing things to sell to the belligerents at high prices. In return, they received paper money and paper bonds. There are bales of marks and rubles in Denmark and Holland. How rich these countries are, as a result of the war, depends largely on the future market for second-hand paper.

On the farms on which cost accounts were kept in Denmark, the milk production per cow in 1916-1917 was 7,300 pounds. Two years later it averaged 4,520 pounds. On a farm which I visited the production for twenty years showed a gradual increase until it reached 4,694 kilograms in 1913. It dropped to 2,734 in 1919 with the same cows and the same management. The drop shows to what extent Danish milk yields are dependent on American feed. They are now bringing the production back to normal.

Not only was internal trade disorganized by the war, but such great international differences are set up that each nation is attempting to be self-sufficient. It is much as if a dozen rivers all tributary to the same sea had been dammed at various points. It would be best not to have the dams there, but the volume of water back of the dams is very real. There are three ways of proceeding. One is to open the dams at once, but this is too destructive. Another way is to build the dams higher. Still a third way is to let the water in each dam down gradually. Each of these methods has its advocates, but on the whole the last one is slowly winning.

Currency depreciation on a gold basis proceeds at about the same rate as inflation but prices lag behind inflation. Hence, in an inflating country, gold prices are lower than in countries that are stable or that are deflating. Prices in Germany are usually approximately two-thirds of the world price when corrected to a gold basis. This is the reason why the visitors from western Europe or America can live so cheaply and buy so cheaply in Germany. It makes our farm products appear unreasonably high to all of middle Europe and checks trade.

Another effect of the war is a decrease in the efficiency of labor. The output per worker in Germany is said to have fallen more than one-fifth. In the Ruhr district, coal production is said to have declined one-third per worker. Everywhere efficiency of labor is decreased. There are many reasons for this—the eight-hour day, poorer food, the loss of many of the best workers, the fact that those who went to war missed their apprenticeship and education, are some of the causes. Mental unrest and the philosophy that “there is plenty for us all if I could only get my share” plays a large part. I have seen no statistics concerning the efficiency of farm labor, but believe it has not fallen as much as city labor. Dr. Russell of the Rothamsted Experimental Station, estimates that a reduction in hours from nine to eight, that decreases the time 11 percent reduces production 14 percent, due to the fixed amount of time used in hitching, unhitching, etc.

For some years, the standard of living will be lower than before the war and for many years it must remain far below what it would have been. Inefficiency in work and the necessity of devoting a large amount of time to permanent improvements will keep the standard of living down. The mistake is frequently made of estimating Europe's demand on the basis of prewar consumption. Need and demand are two different things.

Two great improvements will come to the agriculture of eastern Europe as a result of the war, in fact for Russia and eastern Europe the agricultural changes will probably be the outstanding changes resulting from the war. They will last long after the present boundaries and other provisions

of the peace treaty are forgotten. One is the breaking up of the large estates, and the other, at the opposite extreme, is the combining of the small strips of land. In parts of Germany and in all parts of countries of the East, the large estates were numerous. With very ignorant and shiftless peasants large estates were logical. They practiced good farming methods, used a large amount of machinery, and produced more food than small farmers would have done, but they have lasted beyond their time. For some years production will be lessened by breaking up estates, but everywhere except with the very lowest grade of peasants there will ultimately be an increase in production if readjustment is made to the family-sized farms with individual ownership.

The laws for division of estates vary from purchase and systematic sales to peasants, as is arranged for in Germany, to confiscation by the Russian plan. These methods show the degree of civilization in the various countries and are indications of how long the transition period will be. The law for Germany was drawn by Professor Sering, head of the department of economics of the University of Berlin. The ideal in mind was the family-sized farm. Even the leading German socialists are said to recognize that their theories will not work on farms and that the family-sized farm is best. They usually make the farms too small so that efficient methods can not be used. Europe is full of the "make work" idea. We are not free from this pernicious theory in this country. Dividing the work so that a family will have less than it can do with efficient methods merely means holding down the standards of living. In eastern Europe there is altogether too large a proportion of the population on farms, many persons should enter industries. Attempts to keep them all on farms block progress. Where the regard for law, and the police service are good enough so that the peasants can live on the land, the best organization develops. The practice of living in villages is a matter of protection or a relic from the days when protection was necessary.

In much of Europe the opposite extreme in land-holdings has developed because of the pernicious practice of dividing the farm into as many pieces as there are children. For example, in many parts of Roumania land is owned in strips from six feet to six rods wide. These scattered small strips make the farmer spend most of his time on the road going to his various patches. There is no use in trying to use improved seed, for the crop will be mixed with that of the neighbors, nor can much be done in the control of weeds. Such land ownership tends to make all sink to the level of the lowest. With very ignorant people, some restriction on the transfer of land may be necessary, but systems of land ownership that compel constant division of land and do not allow for free sale are ruinous. The land policies of Europe need thorough restudy. A few men, too few, are giving attention to the land question. In Austria, Dr. Karl Haager is working on the problem of combining the strips of land into real farms.

The great problems of agriculture in Europe are connected with land ownership and the freedom of the purchase and sale of land. It is very unfortunate that more statistical data are not available in these countries on such questions as: Relation of size of farms and relation of land tenure to labor income, crop yields per acre, production per worker and the like. If a fraction of as much attention had been given to these problems as has been given, for example, to chemistry, the present movement could be

directed with greater wisdom. The tendency has been to accept nothing but careful physical measurements in the field of chemistry, but to depend too largely on philosophy in the field of agricultural economics. Their need is the same as ours—agricultural economics that is based on figures, just as physics and chemistry are based on figures.

The symposium was continued by J. G. Lipman of the State University of New Jersey, who discussed agriculture in Czechoslovakia.

#### ORGANIZATION OF AGRICULTURAL EDUCATION AND RESEARCH IN CZECHOSLOVAKIA

BY J. G. LIPMAN

The migration of the Slav peoples into Central Europe, the Hussite Movement, the Thirty Years' War, and the policy of repression followed by the Hapsburgs form an interesting background in the evolution of education in Czechoslovakia. The area included within the present boundaries of the country is somewhat larger than that of New York and smaller than that of Wisconsin. The population of the country as reported in the Census of 1910 was about 13,500,000. This was distributed to the extent of 6,800,000 in Bohemia, 2,600,000 in Moravia, 600,000 in Silesia, 3,000,000 in Slovakia, while the remainder is found in the territory designated Russian Subcarpathia. About two-thirds of the inhabitants of Bohemia are Czech and about one-third German. In Moravia less than 28 percent of the population are German, while in Silesia about 46 percent are German. Broadly speaking, about one-third of the population of Czechoslovakia is German, while two-thirds of it is represented by Slavs together with other racial groups. It is evident, therefore, that for a mixed population of this type a uniform method of education is not practicable, particularly in view of the old racial and religious animosities, which always smolder and now and then burst into flame. The Czechs, Slovaks, Ruthenians, Poles, Magyars, and Germans all have their preferences and prejudices as to the schooling of their children, but all of them have a wholesome respect for learning. The school system of Bohemia, Moravia, and Silesia is well organized and the number of illiterates is surprisingly low. It is claimed to be less than 3 percent of the population. In Slovakia, on the other hand, the prewar attitude of the Magyar government is reflected in the backward condition of the population. The 1910 Census reported 27.8 percent of the entire population as being illiterate. This educational handicap is, however, being rapidly overcome. In 1917 there were available for pupils of 6 to 14 years of age 6,163 Czech schools, 3,910 German schools, 11 Czech-German, 28 Polish-German, and 165 Polish schools. The pupils attending these schools were nearly 1,700,000. Since the revolution there have been established in Slovakia approximately 3,700 primary schools. Of these 2,787 are Slovak, 33 Slovak with German or Magyar annexes, 773 Magyar, 121 German, and 8 Magyar and German. There are 173 Czech secondary schools in Bohemia, Moravia, and Silesia, with about 53,000 pupils. There are also 124 German schools with about 25,000 pupils, and 3 Polish schools. In Slovakia there are about 50 secondary schools, 38 of which are Slavic, 10 Magyar, and 3 German. There are also 6 secondary schools in Subcarpathian Russia. Mention may also be made of commercial schools, rep-

resented by 190 Czechoslovak, 71 German, and 2 Magyar institutions. There are 1,170 professional schools and 162 agricultural schools. Among the institutions of higher learning there are 3 Czech universities and 1 German university. There are, likewise, 6 polytechnic institutes, of which 3 are Czech, 2 German, and 1 Czech with a German annex. This statistical enumeration of the primary, secondary, and collegiate institutions shows that the population of the new republic is not a unit in its educational aims and methods. Time will tell whether a common language and a new system of education is to become acceptable to all of the inhabitants.

A consideration of the material resources of Czechoslovakia will help us to reach an understanding as to the type of education that will best meet the existing needs. It is to be remembered that Czechoslovakia is rich in mineral resources, particularly coal and iron. Important metal industries have, therefore, been developed in Bohemia, Moravia, and Silesia, and the success attained by the industrial enterprises is due in large measure to the technical skill and general education of the leaders in these industries. Agriculturally speaking, Czechoslovakia is a very progressive country. The cultivation of cereals and sugar beets is occupying a prominent place, and the production of enormous quantities of beet sugar has reacted favorably on the entire economic life of the country. Somewhat more than 40 percent of the entire population of Czechoslovakia is agricultural, about 30 percent of it is industrial, and the remainder is engaged in other occupations.

The Czech and German universities of Prague, with 7,000 and 3,700 students respectively, the 531 students at Brno, and 210 students at Bratislav will furnish many of the leaders in the economic life of their country, as will also the 11,000 students in the Czech and German polytechnic institutes. That the men properly trained in these institutions may find abundant opportunity for employment is shown by the fact that many of the industries employ a large number of technically trained men. For instance, the ceramic industries produce commodities worth about 100,000,000 crowns per annum. These products include porcelain, kaolin, paving bricks, and refractory earthenware. The textile industries have an output equivalent to 900,000,000 crowns per annum and turn out enormous quantities of cotton, linen, wool, jute, and other fabrics. The metal industries are fully as important as the ceramic and textile industries, for their output is equivalent to more than 1,000,000,000 crowns per annum. Automobiles, agricultural machinery, enamel ware, and numerous other commodities utilize the services of skilled labor and of technical experts. In the wood-working and leather industries the demand for technically trained men may not be so pronounced, but opportunity for employment is offered also here to graduates from technical schools and the universities. Agriculture furnishes the raw materials for manufacturing processes. There are 189 sugar refineries with an output of 800,000 tons of sugar, 676 breweries whose output is equivalent to more than 13,000,000 hectoliters of beer, 1,100 distilleries with a production of more than 1,000,000 hectoliters of alcohol, and 380 establishments where fruits are canned or preserved. Many creameries, cheese factories, and malt factories add to the number of establishments in which technical training of some sort is an asset.

Public instruction of an extension character was begun after 1870. Fraternal and labor organizations interested themselves in the establishment

of libraries. This was also done by political and semi-political organizations in their efforts to educate the working men and peasants. In 1919 a law was passed which provides for the organization of district committees having jurisdiction over the organization of courses of instruction. Similar courses are also being offered in the army. Each division has an officer especially designated to organize and supervise instruction in civics, and the men in the service are expected to devote several hours a week to the study of this subject. Dramatic clubs, whose number is large, may also be regarded as a factor of some moment in the spread of education.

Considerable effort is being given by the people in Czechoslovakia to the maintenance of public libraries. In 1910 more than half of the communities in Bohemia had library associations. There were in that year 3,885 Czech and 700 German public libraries in Bohemia, controlling approximately 1,600,000 volumes. The most important of these was located in Prague and had about 100,000 volumes. Another important public library was located at Litomysl, whose collection comprised 30,000 volumes. Aside from this there were more than 2,000 libraries owned by library associations. Of these, 1,819 were Czech and 32 German. Important libraries are located at the institutions of higher learning. The library of the University of Prague has 500,000 volumes; that of the National Museum at Prague, 300,000 volumes, and that of the monastery at Strabov, 100,000 volumes. Important libraries are found also at Brno, Olomouc, and Bratislav. Moravia and Silesia had in 1919, 1,896 Czech and 291 German public libraries, aside from 1,237 libraries maintained by library associations. A library school, offering a one-year course, is also being maintained.

The organized pursuit of science was begun by the Czechs in 1348 with the establishment of the University of Prague. Its rector, John Huss, exercised a wide influence and helped to make Prague one of the cultural centers of Europe. During the reign of Rudolph II (1575-1612) some of the leading scholars of Europe were connected with the university, among them, Kepler, Brahe, Jesenius, and Mattioli. After the Battle of the White Mountain in 1622 Czech culture was largely suppressed and one of the noted scholars of the day, Jan Amos Komensky (Comenius), had to seek a home in foreign lands. The rebirth of Czech culture came after the middle of the 18th century. A strong movement developed in behalf of the use of the Czech language. In 1882 the University of Prague was divided into two independent universities—one Czech and the other German. In the late 80's and the early 90's a large number of Czech societies were organized and new Czech journals were established. The Academy of Sciences and Arts at Prague came into being in 1891. Massaryk was one of the leaders in the organization of the study of philology, philosophy, sociology, medicine, and the natural sciences. At the end of the 19th century the Czech scholars had become more prominent than the German scholars, both as to number and international reputation. Since the Revolution the causes of learning received a further stimulus through the organizing of two new universities, one at Brno and the other at Bratislav.

Much importance is attached in Czechoslovakia to physical training. The associations known as Sokols (falcons) make provision for the physical training of children as well as of adults. Architecture, painting, sculpture, and the drama are prominent, both as to achievement and wide popular interest in them. It would be out of place to attempt to discuss here the

progress of Czech literature. It would be proper, however, to mention here that there are in Czechoslovakia 1,885 Czech and 470 German periodicals. There are, likewise, 90 periodicals published in other languages, such as Magyar, Russian, French, English, Italian, Polish, etc. The list of these periodicals shows 780 devoted to politics and sociology, 322 to technology, commerce and industry, 107 to economics, 107 to religion, 74 to medicine and physical culture, and others to mathematics, geology, natural history, jurisprudence, theology, music, philosophy, etc.

In 1922 the country possessed a large number of schools organized for instruction in agriculture. There were in that year 6 agricultural institutions of higher learning, 1 academy, 16 secondary schools, 27 primary schools, 96 winter schools, and 9 special schools. For teaching pomology and viticulture there are 2 secondary and 10 primary schools. There were in all 20 schools for the training of farm managers and 8 forestry schools. The total number of agricultural schools is 215 as against 155 in 1917-1918. The budget of the Ministry of Agriculture for 1922 provides more than 31,000,000 crowns for primary and secondary agricultural schools. Additional funds for agricultural education are derived from individuals and organizations, which materially increase the total.

There are in Bohemia, Moravia, and Silesia 25 agricultural experiment stations. These stations are maintained partly by the state and partly by associations. There are also a number of stations privately maintained. Most of these experiment stations are centered about Prague, including the Station of Experimental Physiology of the Chamber of Agriculture, the station now carrying on experiments with commercial fertilizers maintained by the Chamber of Agriculture, the experiment station for the study of agricultural bacteriology, the Dairy Experiment Station, the Agricultural Machinery Experiment Station, the Station of Agricultural Chemistry, the Seed Control Station, and others. The very large Institute of Experimental Agriculture at Brno had a budget in 1922 of 1,187,600 crowns. A plant-breeding station is maintained at Prerov in Moravia. In general, most of the experiment stations are attached to agricultural colleges and universities. For instance, at Tabor the station for testing agricultural machines, for the growing of forage plants, and phytopathology, at Rudnice the station for agricultural chemistry and phytopathology, at Plzen the station for the study of dairy products, at Chrudim the station for plant improvement, at Kromeriz the station for the investigation of dairy problems, and at Prague the stations of brewing and distilling. Experiment stations have been established at Bratislav, Kosice, and Stavnice. Arrangements are being made for the organization of other stations, among them for the furtherance of fish culture, apiculture, silviculture, and cattle breeding. All of the Czech experiment stations are federated under a central office at Prague. Among the experiment stations privately maintained there is one for the investigation of sugar problems at Prague, one at Dobrovice-Semeice for seed improvement, especially the improvement of beet seed, as well as a number of other experiment stations. The budget of the Ministry of Agriculture for 1922 contains an item of 18,514,427 crowns for the support of experiment stations, and altogether the budgets of Bohemia, Moravia, and Silesia represent a total of more than 55,000,000 crowns for the support of agricultural schools and experiment stations.



W. H. Stevenson of Iowa State College, former delegate of the United States to the International Institute of Agriculture at Rome, spoke on Italy and the institute as follows:

Italy is classed as a backward country in education and research, but it should be said in full justice to that country that ever since the union took place in 1870, the government has given a great deal of time and thought, and also money, to the development of these lines of work. We find in Italy 21 great universities, 9 of which are doing really important work.

There are in Italy about 60 schools that are giving agricultural work. It was my pleasure to visit one of those schools which is located just south of Milan. I found, in a general way, that its equipment is not very different from that which we find in one of our secondary agricultural schools in this country. I have every reason to believe that the institution is doing very good work.

However, the institution in Italy in which I am primarily interested now is the International Institute of Agriculture. A year ago, at your meeting in New Orleans, Mr. Estabrook gave you some facts regarding the organization of the institute. I will attempt at this time to describe briefly the work the institute is attempting to do, and tell you something of its success in recent years.

#### THE WORK OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE IN RELATION TO AGRICULTURAL EDUCATION AND RESEARCH

BY W. H. STEVENSON

The International Institute of Agriculture is an international clearing house for agricultural information. It is also an agency that renders splendid service in the field of agricultural education and research. The institute is truly international in character, for almost all of the countries of the world "without distinction of religion, race, language, or political constitution" united to found it and now support its work. Practically the whole civilized world is associated in the work of the institute. There are now 63 adhering countries in this organization, which represent about 98 percent of the total population of the globe and nearly 97 percent of the land area of the earth.

The objects that the International Institute of Agriculture seeks to accomplish are set forth clearly in article 9 of the treaty. They are:

(1) To collect, study, and publish as promptly as possible, statistical, technical or economic information concerning farming, vegetable and animal products, the commerce in agricultural products, and the prices prevailing in the various markets.

(2) To communicate to parties interested, also as promptly as possible, the information secured under the provisions of the first paragraph.

(3) To make known the new diseases of plants and animals which may appear in any part of the world, showing the territories affected, the progress of the diseases and, if possible, the remedies which are effective.

(4) To study questions concerning agricultural cooperation, insurance, and credit in all their aspects; to collect and publish information which might be useful in the various countries for the organization of forces connected with agricultural cooperation, insurance, and credit.

(5) To submit for the approval of the Governments, if there is occasion for it, measures for the protection of the common interests of farmers and for improving their conditions, after having utilized all the necessary sources of information, such as the recommendations expressed by international or other agricultural congresses or by congresses of science applied to agriculture or agricultural academies, learned bodies, etc.

With these declarations as its guiding principles, the institute started work in 1908; a work that is unique in many ways. For example, although strictly international in character, the institute "carried on" during the entire period of the war, in a manner that merited and received the approval of all nations. It is doubtful if any other international body can lay claim to such a record of achievement. It is worthy of note also, that the program of the institute as outlined above, is unique in that it deals with practically all phases of world agriculture. An organization that faithfully carries out such a program must be a potent factor in the field of agricultural education and research. It can truly be said that the work that has been accomplished by the institute has been constructive and vital and has been helpful in building up the educational and research activities in many countries. A brief review of the institute's principal achievements will show clearly to what extent all classes of people in all quarters of the globe have been helped by the institute's program, or at least have had an opportunity to secure helpful suggestions and guidance. It is worthy of note in this connection that many of the so-called backward agricultural countries have often testified, through their representatives in Rome, to the value of the institute's publications in shaping and building up their educational and research work and in giving form to their legislation along economic and agricultural lines. The writer recalls many statements of this kind that were made to him by public men from South American countries and also by men from various sections of Africa. For example, one of the agricultural leaders of Southern Africa stated that his institution was too poor to buy a large number of reference books and technical journals and for that reason his staff depended largely upon the institute's publications to keep themselves informed with reference to the world's progress in the field of agriculture and more especially regarding experiment station research.

In order that we may the more easily understand the official character and true value of the information and data supplied by the institute, it is worth while to note the following facts:

(1) The International Institute of Agriculture is truly an international organization and collects *official* agricultural information supplied by the adhering governments. In this group are included all of the important agricultural countries of the world.

(2) Information from unofficial sources can be used only when it is vouched for by the authorities of the country from which it is received.

(3) Four bureaus, each with a staff of experts, have charge of the collecting of information from official sources. All of the facts and data that are secured by means of questionnaires, postal and telegraphic requests, and through other channels, such as government reports and other publications, are worked over, edited, and published in the form of monographs, yearbooks, bulletins, circulars, and reports of various kinds.

In addition, the following facts seem to show that this dependable, official agricultural information, that is collected and distributed by the International Institute of Agriculture, has a real, tangible value:

(1) In the summer of 1921, a well-known American banker, who has long been recognized as one of New York's leading financiers, made a tour of Europe in order to study political and economic conditions. Later he published a widely read book that contained his findings. This banker, while prosecuting his studies, found that he needed reliable data concerning the supply of foodstuffs on the Continent as compared with the pre-war supply. He visited the institute, stated his needs, and was promptly supplied with all available statistical information on the subject of his inquiry. It is very doubtful if reliable, official data on the food supply of Europe would have been obtainable anywhere, at the time this banker made his inquiry, if the statistical service of the International Institute of Agriculture had not been organized; or if after organization, it had failed to induce several European countries to establish up-to-date systems of crop reporting and still other countries to greatly improve their systems.

(2) About one year ago the California Fruit Growers' Association was in search of information concerning the lemon crop of Sicily and the status of the lemon industry in that country. Italy does not publish statistics on these subjects, and data were not available. The institute assigned the problem to experts on the staff and very soon a fund of information was on its way to California that proved of real value to the officers of the association that forwarded the inquiry.

(3) Several years ago there was a widespread demand in this country for legislation that would give America an efficient rural credit law. David Lubin, who was then the delegate of the United States to the institute, had sensed for a long time the growing interest, in this country, in the subject of rural credits. He saw in this movement an opportunity for the institute to provide the people of a great nation and of the world with data on an important economic subject.

Facts and data on rural credits were collected and published and there is no doubt that America's initial legislative action along this line came earlier than would have been the case had the institute failed to make use of a splendid opportunity, first to bring together and later to send out the world's store of valuable information on rural credits.

(4) Practically all of the people of the world are deeply interested in the distribution and price of the world's greatest bread grain and other food products. In the old days before the institute provided reliable statistics, speculators in foodstuffs often spent large sums of money to secure facts about the condition of growing crops in various parts of the world and to get harvest records. This form of activity was not bad in itself; but quite often unscrupulous dealers used the information thus collected for selfish ends. For instance, a group of these men would report prospects for a large crop of wheat in important wheat growing countries. As a result, the price of wheat and other grains would decline. Their next move, of course, was to buy from producers at relatively low prices. Later, the report would go out that something had gone wrong with the crops and the speculators would then proceed to sell their accumulated stocks of grain at relatively high prices. This was a very profitable game for the speculators, but it worked against the best interests of both producers and

consumers. This system and other related abuses were possible because of a world-wide lack of dependable data on production, supply, exports, imports, and all of the other factors that have to do with the buying and selling of important foodstuffs. It is now an established fact that reliable crop news is available to all groups and classes because of the statistical service maintained by the institute. Farmers and city people alike now have some real protection against the old types of speculative abuses that were founded on unreliable crop reports. The work of the institute in supplying information on crop conditions, estimated yields, actual harvests, wholesale and retail prices and their fluctuations, stocks on hand, exports and imports, the food requirements of different countries, and other facts of this character stamps this institution as one of the leading organizations of Europe and of the world in the field of agricultural statistics. It is true that the data published by the Bureau of Statistics are, for the most part, quite technical in form. It is also true that the scope of the statistical service should be greatly enlarged; and much greater use should be made of the telegraph to expedite the work of securing statistical reports and forwarding these to adhering governments that are interested in them. But in spite of all of these facts, the statistical service of the institute has done much to unify and improve the crop reporting systems of the adhering governments and has given people everywhere a vast amount of useful information in the form of agricultural data.

(5) Students and research workers find accurate and reliable information in the "International Yearbook of Agricultural Statistics." This is a compendium of world statistics and is a valuable book, especially for reference purposes, inasmuch as it contains official information on crop and livestock statistics for practically all of the countries of the world. Some idea of the scope of this important publication is gained from a glance at the chapter headings that read as follows: (1) Area and Population of the Different Countries, (2) Division of the total area into Productive and Unproductive Areas, (3) Areas and Yield of Various Crops, (4) Censuses and Annual Returns of Livestock in Each Country, (5) International Trade in Agricultural Products, (6) Imports and Exports of Agricultural Products, (7) Consumption, (8) Prices, (9) Rates of Ocean Freight, (10) Rates of Exchange, (11) Fertilizers and Chemical Products Useful in Agriculture. Many American economists and other students of agricultural problems are known to place a very high value on the contents of this yearbook, as a source of information regarding practically all phases of agricultural production, the movement of crops, surplus stocks, imports, prices, and many other related subjects.

(6) The governments of all countries are called upon from time to time to enact agricultural legislation. The institute renders a great educational service to these governments through the activities of its Bureau of Agricultural Legislation. This organization collects all of the laws enacted throughout the world dealing with agriculture. All important laws are published, soon after their enactment, in the form of separate leaflets. These leaflets are forwarded, with the least possible delay, to the adhering governments. Each year these laws are collected into a "Yearbook of Agricultural Legislation." This is a valuable reference volume for all persons who are directly concerned with the framing and execution of laws that relate to agriculture or country life. For example, there is a special

interest in these days in laws dealing with land tenure systems, in legislation relative to the fixing of the prices of farm products and in acts dealing with the export and import of such products. The yearbook contains the maximum amount of information on the laws of the various countries that deal with these subjects. An interesting and useful feature of the yearbook is an analytical introduction that contains discussions of the broad lines of agricultural, legislative developments that are mentioned in the laws enacted during the current year.

(7) A few weeks ago the writer asked the librarian of a State college of agriculture and mechanic arts this question: Can you tell me just what type of publication, issued by the International Institute of Agriculture, is used to the greatest extent by our faculty and students? This was the reply: Yes; nearly all of our calls are for the "International Review of Agricultural Economics." This monthly bulletin is available in English. Unfortunately, this is not the case with the Yearbook of Statistics and the Yearbook of Legislation. This fact, undoubtedly, explains in part the reason for the librarian's answer. It is true, however, that the work of the institute in the field of agricultural economics has an educational value that is recognized by all students of this subject. The institute collects and publishes data and general information regarding agricultural co-operation, insurance, credit, and practically all questions relating to agricultural economics and social problems. Reviews are prepared covering most of the important current articles and, in addition, some special articles are published on timely subjects. These are written by members of the staff or by experts who possess special qualifications for the work.

(8) There is another broad field of agricultural activity that is included in the institute's program of work. An effort is made to keep farmers and scientific workers informed concerning the scientific, experimental, and practical progress made in the various lines of agriculture. Official information is often received direct from the governments, but the major part of the data that is given out by the institute is in the form of abstracts of articles that appear in the very large number of journals, bulletins, and periodicals which are received from all parts of the world. An enormous amount of labor is expended on this phase of the work. Many of the leaders in the smaller and more backward agricultural countries insist that their people get more direct benefit, from an educational and research standpoint, from this work than from any other that is now carried on by the institute.

(9) There is a widespread and insistent demand in all progressive countries for exhaustive reports dealing with subjects that are of special interest to farmers or to certain groups of business men. The institute has long recognized this fact and has met the situation, as far as has been possible with limited funds and a small staff. Some very valuable monographs have been published that contain information that large groups want and use in their business operations. For example, there has been a strong demand during the past year for the monograph entitled: "Oil Products and Vegetable Oils; Statistical Study of their Production, Importation and Exportation." Other valuable and recent publications in this class deal with (1) the agricultural development of Brazil, (2) the collection of waste materials and their utilization, and (3) international

trade in livestock and animal produce. Other publications in this class might be mentioned.

The foregoing facts regarding the activities of the institute prove that this institution is an effective agency in the promotion of agricultural education and research. Friends of the institute are pleased with the record of its accomplishments, but they realize that there are still many important agricultural activities which should be studied because men have an interest in them and because they represent, in many cases, major programs of work. For example, there is an urgent demand for more complete and timely statistics on cotton with special reference, first, to reports from cotton producing countries that do not now furnish data and, secondly, with reference to production figures that distinguish between long staple and short staple. There is also a demand for dependable and useful information concerning statistics of forestry. The institute recognizes the importance of forestry studies. The following resolutions dealing with this subject were passed by the General Assembly at its meeting in May, 1922:

(1) To call upon the International Institute of Agriculture to arrange, as soon as funds permit, for the establishment, in collaboration with the adherent states, of a regular service of international forestry statistics.

(2) To publish studies on general lines of the position of forestry in the various countries, treated from the administrative, legislative and technical points of view.

(3) To publish statistics, (1) on forest production, (2) on the trade, and (3) on the prices of timber and the other chief forest products, at such intervals as are suitable for each branch of the subject.

The institute has also been called upon to "obtain data on the dairy industry"; to "make an inquiry as to the proper measures to be taken to increase the production and use of fertilizers"; to consider "the advisability of the appointment of an expert in tropical agricultural science charged with this section of the work"; to "occupy itself with all questions of agricultural instruction" and to recommend to the adhering governments "the development of meteorological studies and research in connection with agriculture." It is expected that at an early date the institute will establish and maintain a service that will make a world-wide study of the relation of meteorological factors to the growth of plants and the yield of crops.

It is worthy of note that the institute recently adopted resolutions that will lead to marked improvements in all of the general lines of work, provided funds become available. A more extended use of the telegraph in the statistical service will improve and speed up the reports on crop conditions and forecasts. Hereafter, the two monthly publications, the *International Review of the Science and Practice of Agriculture* and the *International Review of Agricultural Economics* will be issued as quarterlies. This change will undoubtedly result in a steady improvement in the material that is printed in these reviews and will add greatly to their value.

For more than a decade the International Institute of Agriculture has been one of the world's helpful agencies in the promotion of agricultural education and research. Its usefulness will increase by leaps and bounds in the future if it receives the full measure of support from the adhering countries to which it is entitled on the basis of its record.

The symposium was continued by President K. L. Butterfield of Massachusetts Agricultural College, who spoke on China and Japan, as follows:

#### AGRICULTURAL EDUCATION AND RESEARCH IN CHINA AND JAPAN

BY K. L. BUTTERFIELD

Public education in Japan is modelled more nearly on German forms than on American. Higher agricultural education has been concentrated in the Imperial University in Tokyo, although the agricultural school at Sapporo, established in 1875 under the leadership of President Clark of the Massachusetts Agricultural College, has trained many leading agriculturists and is now a branch of another Imperial University in that city. These two institutions carry, therefore, practically all of the agricultural education of university grade. There are two higher agricultural and forestry schools and three higher agricultural schools. These schools are a little below our own colleges in grade, taking students from the middle schools at about the age of 17 and giving them as a rule a three-year course. The study of agriculture in the grades above the elementary is followed widely and is intended for boys of high school age who go back to the farm. Agriculture for two years is optional in elementary education.

Considerable research is carried on by the agricultural colleges in the two Imperial universities and to a minor extent by the technical schools. The Ministry of Agriculture, however, has experiment stations and is responsible for a large amount of research. There is no question but the agricultural research men are well trained and are working at fundamental problems.

I found, for example, in Sapporo that the professor of economics is giving a large share of his time to the problem of the Japanese national dietary. Economic problems naturally occupy a good deal of attention. The re-division of the small land holdings and the organization of credit and other cooperative societies have been subjects of thorough study and of strong leadership. It may be said in general that Japan has approached its agricultural problem in the spirit of thorough-going investigation and by the method of providing thoroughly trained specialists for all branches of endeavor that seem to promise agricultural efficiency. The social problems, more particularly those concerned with the village community, are now attracting attention.

When in Japan I paid a visit to Sapporo. In 1870 the Japanese Government decided to colonize the Island of Hokkaido, which has an area of 15,000 miles and lies north of the main islands. The work was put in the hands of a general of the army, and among others, they persuaded President William A. Clark of the Massachusetts Agricultural College to go there in 1875 and stay one year. His job was to establish an agricultural school, which he did. There followed President Clark seven or eight graduates of the Massachusetts Agricultural College, Dr. W. P. Brooks staying nearly twelve years, all told. From that school, and the university that grew out of it, have come not only a good many leaders in agriculture in Japan, but some of her leading publicists and strong men. In other words, America nearly fifty years ago made a real contribution to the progress of agricultural education and research in Japan.

This is a very inadequate description of agricultural education and research in Japan, which has taken hold of this matter with her usual thoroughness, and has probably developed the field as well as any country, considering her resources and in the light of her particular problem.

China has not been able thus far to develop agricultural education with anything like the same thoroughness and completeness as has Japan. Her problem is infinitely more difficult. A huge country, with a great and diversified agriculture, with an inefficient central government, with antiquated methods of taxation, and with a system of education less than twenty-five years old—China faces a stupendous educational task. I want to emphasize that fact, because it not only lies in the background of agricultural development and education in agriculture, but it lies in the background of the complete development of China. We perhaps are critical of China because she has not come to a stable government, but we forget that China has but just emerged from centuries of isolation. Ninety percent of her men and 99 percent of her women are illiterate. She has about 4,000,000 pupils in her schools, about one-tenth of the number of school age. She can not have a national system of education until she has a national treasury and a national government. The provinces vary widely in their wealth and in their progressiveness, but they are about all alike in the ineffectiveness of their systems of taxation, and in the lack of ability to offer an educational program. That is the background for agricultural education. As a matter of fact, I can not help feeling that, considering all her difficulties, China has done pretty well.

The present system of agricultural education in China was taken over from Japan less than twenty years ago. It was intended to have a group of agricultural colleges of strictly university grade, junior colleges not giving degrees, and then with provision for agriculture in the middle schools and to some extent in the primary schools. As a matter of fact, however, the seven agricultural colleges are of junior grade and the total number of students in them is less than one thousand. The most promising and apparently the most effective organization for higher agricultural education in China, under government auspices, is in the College of Agriculture of the National Southeastern University at Nanking. This has been built up within the past five years. It has a university course of five years, special courses of one and one-half to two years, as, for example, a cotton growing course, and a summer school for the use of middle school teachers more particularly. This institution has recognized definitely the three-fold division of responsibility in higher agricultural education, namely, research, the teaching of resident students, and extension service. In research the principal efforts are in botanical and zoological collecting, cotton seed breeding and improved methods of culture, wheat experimentation to increase pure seeds, improvement of farm machinery, the promotion of Chinese silk production, and improving silk products, cotton insect investigations, pork production experiments, egg-laying experiments, studies in the production of soy beans particularly with reference to increasing oil content, and sugar beet experiments. In extension the university is attempting an agricultural survey, is printing and distributing bulletins, sending out lecture parties in various farm districts, establishing small rural schools of agriculture, and demonstrating farm machinery.



Several of the junior agricultural colleges carry on research work, particularly the one in Peking, where botanical and entomological work is quite extensive. In the Province of Shansi with its famous model governor, there is a system of county agricultural experiment stations, so-called, each of which seems to be intended as an extension center, the station itself probably being more for testing work and for field demonstration than for actual research. The main difficulties thus far with most of these institutions are, first, pathetic lack of funds, both in amount and regularity; second, lack of thoroughly trained men; third, tendency of the student body to think of agriculture as an interesting intellectual pursuit rather than as a challenge to the solving of problems.

Another difficulty, and this is said in all friendliness, is an undoubted tendency on the part of the Chinese to make much larger plans on paper than can be carried out with the resources at command.

The Federal Ministry of Agriculture in Peking has a pretty extensive extension department, with a staff of some 80 persons, but its work is confined very largely to the area within 100 or 200 miles of the capital—practically a provincial rather than a national service. The work is managed by graduates of American agricultural colleges and is modelled largely on American lines. In fact, the newer efforts to develop agricultural educational research, best exemplified by the new and vigorous agricultural work of Southeastern University just referred to, are obviously modelled after American rather than Japanese practice.

The American Christian Mission institutions are making a far larger contribution to agricultural education and research in China than is usually understood. Agricultural education under Christian auspices began in China at least as early as 1907. At present Canton Christian College maintains a college of agriculture, and the University of Nanking, a college of agriculture and forestry; Peking University has organized an agricultural and animal husbandry experiment station and offers college-grade instruction in the same field; Yale-in-China has several courses in forestry. In addition there are:

- 3 missions offering agricultural work in middle schools;
- 13 missions supporting work for the improvement of crops, animals, farm practice, or forestry;
- 36 missions seeking to create an interest in agriculture by means of lectures, practical work, relating general subjects in the curriculum to agriculture, short courses in agriculture, and the like;
- 52 missions with school gardens, either for teaching the dignity of manual labor, as an aid to nature study, or as furnishing financial self-help to students; and
- 11 missions growing seeds, nursery stock, or vegetables for sale.

The American Presbyterian Mission North has 11 stations doing some type of agricultural work; the Methodist Episcopal six; the Canadian Methodist five. There are in Mission Service at least 15 foreign agricultural specialists in China who hold degrees from agricultural colleges; 13 returned students educated in agriculture; and seven who are graduates of institutions in China—a total of 35 trained men already at work in the agricultural field under the auspices of Christian institutions.

The Canton Christian College, in addition to rather typical college courses in agriculture, has developed some notable experiments in sericulture and has made its discoveries available to hundreds of communities where the principal interest is the growing of silk. The staff is also at work in the fields of dairying, soil management, use of farm machinery, forestry propagation, fixation of varieties, commercial fertilizers, irrigation and drainage. I might add that the Canton Christian College has made such an impression on the progressive provincial government that for several years past it has had its support almost wholly from government sources.

The College of Agriculture of the University of Nanking, while working in many similar lines, has achieved notable improvements in the field of silk culture and perhaps even more notable ones in cotton growing. Here the policy has been to concentrate attention in creating and improving a seed supply by acclimating the best varieties of American cotton and creating superior varieties of Chinese cotton. Some pure improved strains of Chinese cotton have already been produced. In areas back some distance from the coast the yields of American cotton have exceeded Chinese cotton yields by nearly 50 percent, but results nearer the coast seem to indicate that greater progress may be made by improving the Chinese cotton. The matter of increasing the efficiency of labor in cotton production by the use of improved but simple cultivation implements is going on. The pink boll worm is a menace but it is believed it can be controlled. It is hoped to introduce American cotton gins on a community basis.

The agricultural work in the Christian University of Peking is just started, and will naturally emphasize animal husbandry, because all north China has immense possibilities of stock production.

The great underlying agricultural problem in China is summed up in the words "famine prevention." I understand that there is a strong possibility that rather liberal funds will soon be at the disposal of at least two of these Christian institutions for the purpose of cooperating with the Chinese in basic studies relative to such remedies for famine as river conservancy, reforestation, irrigation, transportation, colonization, installation of granaries, seed selection, protection against insect pests and plant diseases, and establishment of credit and savings societies.

Cooperative study between Chinese and American workers is already beginning and should be given the utmost encouragement. China needs the science of the West, but can itself contribute to the West much scientific data concerning varieties, and certainly lessons in thrift. Nothing is wasted, especially that which contributes to the maintenance of soil fertility.

Those of you who have read Professor King's book, "Farmers of Forty Centuries," will have gained the impression that the Chinese farmers are very skilful and thrifty farmers. It is true. It is perfectly amazing how that huge country of 400,000,000 people, has been sustained, and is today more virile and promising than ever before, and how in spite of its great population it has managed to feed itself; and this has been done by the farmer's work and skill. But, of course, the farmers have no knowledge of science; they are perfectly helpless in the face of insect pests and diseases, and almost entirely helpless in the face of great floods and drought; and the first need, therefore, is developed adequate research.

Agricultural education in China, to a large extent, awaits an attack upon the fundamental problems from the standpoint of thoroughgoing and scientific research; and that, of course, means in turn, money, men, and time.

We in America are sometimes appalled at the tasks involved in agricultural education and research in a country containing 30,000,000 farmers. China has the problem of developing adequate agricultural education and research in a country containing 300,000,000 farmers.

THURSDAY MORNING, NOVEMBER 23, 1922

The convention was called to order at 9 o'clock A. M. by the vice-president.

A. C. True of the United States Department of Agriculture, made the following bibliographical report:

#### SELECTED LIST OF REFERENCES ON THE PREPARATION AND USE OF ILLUSTRATIONS

In accordance with the action of this association in 1920, the bibliography presented herewith has been prepared under the direction of the Director of the States Relations Service by Miss Martha L. Gericke, librarian of that service, who has also had the assistance of Messrs. Reuben Brigham and C. H. Hanson, specialists in visual instruction in agriculture in the service.

This paper has been prepared as an aid to educators in agriculture and home economics desiring to make the most effective use of illustrations in their work. Authorities in education, generally, are accepting the illustration as essential in supplementing the written word. Where the student or reader can not be shown by actual demonstration how a thing should be done, the picture or series of pictures showing steps in the process or practice taught is recognized as the most effective substitute. As notable an authority as Dr. Chas. W. Eliot, President-Emeritus of Harvard University, says:

"I have been urging for some years past that American education is seriously defective in that it provides an inadequate amount of training of the senses, particularly of the eye. It relies far too much on book-work. There ought to be incorporated into elementary and secondary school work a much larger proportion of accurate eye-work and hand-work, combined with simultaneous training of the memory and of the capacity for describing correctly, either orally or in writing, things observed and done."

With the advent of the motion picture and the picture page in the daily newspapers, the American people, both urban and rural, have become more and more picture-minded. The tendency, therefore, in work in agriculture and home economics, as well as in other lines of educational work, is to make more use of illustrations. Using both photographs and drawings as a basis, illustrations are being employed in such work in a large number of ways. These include their use in technical and popular bulletins and other publications, in text-books, and in connection with newspaper and magazine stories. They are also used effectively for teaching purposes, as lantern slides and as photographic enlargements, and in charts, exhibits,

and educational posters. The motion picture is being used with increasing effectiveness in certain phases of such educational work.

With the increased use of illustrations it has become essential that they be of much higher quality than those used even four or five years ago, and that they tell definitely and clearly the story the worker wishes to present with their assistance. This makes it essential that the worker desiring to take advantage of the educational value of illustrations give thought and care to both the preparation of the basic material and to the way in which he uses it. In consequence he needs to be thoroughly grounded in the elements of the preparation and use of illustrations for educational work. For the convenience of such workers, the list of references to which this statement is an introduction has been classified into six groups as follows: General photography, photography in relation to the natural sciences, motion pictures and lantern slides, graphic methods, preparation of illustrations for publication, and periodicals on photography and motion pictures. The listing of more technical or professional publications has been purposely avoided as the need of elementary information on these subjects is felt to be the more urgent among workers in agriculture and home economics at the present time.

It is believed that the appended selection of references will largely meet the needs of the average worker in agriculture and home economics in this country and will aid him in illuminating the ideas which he wishes to present in a way to impress his students or readers and stimulate action on their part along the line of his teaching.

In this list no attempt has been made to include the many excellent works on photography that have appeared in French and German. It has also been considered impractical with the exception of a few instances to give references to the helpful literature that has been published by the manufacturers of photographic equipment and supplies, and also to the separate articles appearing in periodicals. Attention has, however, been called to the names of a number of the leading photographic journals.

The list includes 100 titles as follows: Photography—General 40, Photography in Relation to the Natural Sciences 11, Motion Pictures and Lantern Slides 23, Graphic Methods 11, Preparation of Illustrations for Publication 7, and Periodicals on Photography and Motion Pictures 8.

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Each number is a complete book in itself. Each number deals with a different subject and tells all worth knowing about its subject."

The Photographic Journal of America. A monthly magazine devoted to the science and art of photography. Monthly. Philadelphia, F. V. Chambers.

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On motion, the report of the bibliographer was received and ordered printed in the proceedings.

**THE VICE-PRESIDENT.** We are greatly honored to have on this program one who has been one of the pillars of this association, a member of the Executive Committee for fifteen years, a past president, and for many years a director of the New York State Agricultural Experiment Station. It gives me great pleasure to present to you Dr. W. H. Jordan of Orono, Maine, former director of the New York State Experiment Station.

#### AFTER FIFTY YEARS

BY W. H. JORDAN

I can hardly adequately express my gratification and pleasure at being able to meet with you once again. What is my pleasure and reward I am afraid may be your penalty. The responsibility for placing this address in your program rests with your Executive Committee, as you well know. In doing this your committee assumed some very evident risks. It is proverbial that the age of three-score years and ten is the age of conservatism. The progressive, with a note of scorn in his voice, styles the conservative a reactionary, an obstructive creature, generally regarded with suspicion, who along with the politician is often cast into the outer darkness of popular disapproval.

Again, when a speaker has the word "retired" after his name it generally indicates that he has stepped aside from life's activities and has perhaps lost touch with current thought and events so that his hearers are in grave danger of listening either to tedious reminiscences or a discussion of receding problems. If this happens at this time your charitable judgment is invoked.

But it is unsafe to conclude that he who is retired is past gaining wisdom, even in small things. Pardon a word of personal reference. After casting aside my official robes, I decided that I must supplement the munificent income from such investments as had escaped the wiles of oil wells and gold mines and other fifty to one hundred percent propositions by tilling the soil. With this in mind, I acquired land adapted to food production and began operations. Here was the beginning of wisdom. The hosts of evil from out of unseen sources encamped against me. Seeds failed to germinate, though scientifically planted. As the shades of evening drew on, the ubiquitous cutworm emerged from his hiding and sealed the doom of many of the few plants that had started in life. Potato beetles perched on the highest potato stalks and with apparent complacency watched the devastations of countless flea beetles. The mycelia of fungi burrowed in the tissues of my much prized plants.

In all this I applied with faith and patience the orthodox defensive methods to which I had subscribed, but in the end I emerged from this

contest on my quarter-of-an-acre farm humbled in pride and pricked in conscience, when I recalled the smug assurance with which in voluminous literature I had caused the farmer to be advised as to the certain ways of overcoming the evils that beset him. This is the wisdom I learned—that some of us have written and talked too much and that station literature should be expurgated. (Extension workers please take notice.)

The subject, "After Fifty Years," indicates a review, statistical and otherwise, of the growth and accomplishments of the land-grant colleges, but nothing of the kind is proposed. The records of these institutions during a half century are known and read of all men. They are embodied in a great educational development, manifested in the enlightenment of agricultural and industrial thought and practice; they form an inspiring chapter in the history of the Great War and they are generally accepted as evidence of a better understanding and fuller mastery of our physical and economic environment.

It may not be amiss, however, now that we are in a reminiscent mood, to glance at the conditions which attended the beginnings of these colleges in order that the younger members of this organization, swelling with pride as they count resources and students, may have some appreciation of what they owe to those pioneers upon whom was laid the trying and almost heart-breaking burden of laying the foundations of these colleges and universities.

First of all, the land-grant college proposition was very coldly received in academic circles, although favored by a small minority of far-seeing educators who realized that the increasing volume of scientific knowledge should be brought to the aid of the industries. To be sure, a few of the older colleges were willing to adopt this new-born offspring of Federal enactment, without doubt acting in good faith, though in one instance the motive which prompted this attitude apparently was expressed by a member of the faculty of a receptive institution when he remarked, "We can at least give the thing a decent burial."

It should not be forgotten, however, that the new institutions were at first almost wholly manned by graduates of existing colleges who entered upon their work with zeal and faithfulness, but with little needed experience in such a new field and with scanty educational tools other than the traditional. Whether or not this enforced selection of teaching material was an advantage in the subsequent careers of those early students is a question worthy of serious consideration.

Popular misconception of the real purposes of the Land-Grant Act caused much criticism and hampered the new colleges in securing the needed support. In the arguments put forth for the acceptance of this act by the States, and subsequently for securing financial support, the practical agricultural side of the colleges was stressed and the people at large were not informed as to the broad purposes of these strangers in the educational field, and when their advertised curricula showed a large proportion of studies common to the classical colleges and when very few students were registered in agriculture and many more in the general and engineering courses, the cry went up that the faculties were composed of educational aristocrats, having no sympathy for the farmer, traitors to the agricultural cause and, therefore, the new colleges were not fulfilling their proper function.

Educational tools were largely lacking, other than those in use by the classical colleges. Such scientific knowledge as could be made useful to agriculture in its possible applications had not been fashioned into teaching form. Rural architecture was in one instance taught by readings in Ruskin's "Seven Lamps of Architecture" and while the class profited much thereby, its members remained a little hazy on the subject of a well-arranged set of farm buildings.

One plank in the new educational platform asserted that the hand and the brain must be mutually trained. Boys who had spent many days plowing and milking cows were supposed not to know how to perform these simple operations or, at least, must not get weaned from manual labor, so it was decreed that students must work with the hands as well as study. The manual training of one freshman, and this is related from memory, began with clearing out the débris from the basement of a new building. Later he milked cows, a practice he had followed at both ends of the day for some years. In haying time he pitched on hay, an operation in which he had previously blistered his hands many times. For all this he was paid at the rate of eight cents an hour plus the store of knowledge which he acquired. This young man was one of three agricultural students and while he did not desert, the general effect of such a mistaken policy was to antagonize, even disgust, other students.

In those days the sessions of the legislature were anxious periods, it being feared that the very scanty desired appropriations could not be secured. It should never be forgotten that the support of professional and business men was a deciding influence in tiding some of the colleges over this critical period.

Out of such discouraging beginnings have developed colleges and universities firmly established in the respect and confidence of the people, whose incomes extend into the millions and whose students are numbered by thousands.

There is no occasion for apologetics. Notwithstanding the fact that mistakes have been made, that the principles of sound pedagogics have been sometimes ignored and educational values sacrificed, evidently deeming it more important to avoid the assumed danger of educating young men away from agriculture than to consider their intellectual welfare, the aggregate result has been a notable achievement in education and a tribute to the faithful service of a great body of educators.

But size and popularity are not sure signs of a wise educational policy nor do they provide an escape from insistent problems. In fact, as the colleges have increased in public approval and influence their relations have become more and more complex, and their problems, both external and internal have increased proportionately.

The increase in the number of young men and women, almost alarming in its proportion, who seek to become your students and ask for instruction along many lines, and the demand for more and more research effort, have doubtless rendered acute your financial problem. Many of our legislators have not yet acquired an adequate conception of what it means to equip colleges devoted to teaching applied science and to secure and hold able instructors and investigators against the attractive salaries now offered by manufacturing corporations and commercial houses.

But it would be presumptuous for me to make suggestions in regard to securing needed appropriations. My experience in your Executive Committee in observing certain college and university presidents at close quarters has led me to conclude that these leaders are perfectly competent to thread the mazes of legislative halls without getting lost or disastrously colliding with the pet notions of influential legislators.

There is, however, one phase of the fiscal situation to which it is desired to call your attention emphatically, not to instruct, for I could not do that, but to exhort. Reference is made to the administration of institutional funds. In certain States, budget regulations imposed by the legislatures have seriously invaded the autonomy of college and station administration through the transference of administrative authority to fiscal bureaus at the seat of government, partially reducing institutional boards and officials to the condition of rubber stamps. This is fiscal reform devoid of practical sense. It is, perhaps, a delicate matter for you to discuss at home in public, but when limitations are placed on the number in a faculty or research staff, irrespective of needs which may arise, when rigid salaries are established, often preventing the retention of desirable men or securing more men or better ones, when maintenance funds are closely segregated into special items without permission to transfer and no contingent fund is provided, when travel expenses cannot be incurred except by permission of a State regulatory department, then the situation becomes obstructive and somehow your constituencies should be made to understand the hardships imposed by such regulations and how they transgress the best interests of agricultural education and research. Perhaps this danger has not appeared to threaten some of you, but be warned, this particular reform(?) bug is likely to fly across your borders at any time.

It should be distinctly understood that no objection is raised against a sane budget system which clearly states the general directions in which appropriations shall be expended and provides for a full accounting of the expenditures.

The discussion of internal problems will be devoted almost entirely to one question: Are the rapidly changing social and economic conditions developing new problems in agricultural education, or at least intensifying the need of more attention to certain of its phases? This discussion is entered upon with a full appreciation of the fact that it may be considered an instance of unusual temerity.

It is hardly necessary to assert that the farmer is living in a new social and economic environment as compared with the late sixties and early seventies, the period when the land-grant colleges were being organized and their early courses of study developed. New social and business conditions now react upon agriculture.

Fifty years ago the western hegira was hardly under way. Since that time there has occurred a nation-wide redistribution of population and production, bringing in its train new social and economic problems. Regional competition in production and marketing had not developed in those earlier days. Then the marketing of agricultural products was a comparatively simple matter. The term, "collective buying and selling" had not been heard. Farmers had not been summoned to court for alleged violation of a Sherman Act.

Agricultural organizations were local and seemed to have little influence and no clear function beyond serving as a medium for exchanging individual opinions on questions of farm practice. Industries were not so fully segregated in large centers, draining, as they have, the rural communities of their young life, thereby creating unfortunate social conditions, for the farm was then more self-dependent industrially than it is now and employment was more widely distributed.

The farmer had not then found an influential place in national politics for he was recognized chiefly in political campaigns. He was not counted as an easy mark for revolutionary propaganda, but was reckoned as a conservative element in the body politic. He had not been accused of "seeing red" and of upsetting the political "kettle of fish" or of becoming dangerous to social and economic stability because of financial hardships.

In short, the great social and economic problems, somewhat disturbing in their intensity, which are now involved in the comfort and prosperity of the agricultural people had not appeared over the horizon. The new colleges took little account of the problems of human relations and their agricultural instruction and outside activities were so far as possible centered around the effort to make "two blades of grass grow where one grew before."

The great change that has taken place in fifty years is forcibly illustrated by the fact that a million and a half of farmers are now organized in support of the efforts of their accredited representatives to secure desired national legislation, efforts so successful as to make us anxious that they shall be wisely directed. Not less than six agricultural organizations have invaded this city to watch legislation and the administration of agricultural affairs. The farm bloc, whatever that term may mean, is said to have dictated to Congress and strongly influenced the action of the President.

Whatever may be said of the influence exerted in the alleged interest of the farmer, the following legislation has been accomplished: An Emergency Tariff Act increasing the duties on agricultural products; the Packer Act, bringing meat packers under Federal control; the Futures Act, taxing contracts for future delivery of grain; amending the Farm Loan Law and the Farm Credits Act, authorizing the War Finance Corporation to issue its own bonds for one and a half million dollars and to lend one million dollars for financing agricultural exports. These measures are cited to illustrate the important ways in which agriculture is now asking for, and securing, national legislation in its behalf.

In the several States, with varying success, farmers are organizing for buying and selling and for the betterment of their social and educational conditions. Surely, agriculture is adventuring in the domain of great problems, and its followers may not be expected to recede from their purpose to promote and defend their fundamental interests, and their fundamental interests are fully as closely related to their social environment and to financial and market conditions as to technical methods. The extra blade of grass must be sold at a profit or it is useless to produce it.

In view of the magnitude of these efforts and their inevitable far-reaching influence we may well be solicitous concerning the wisdom with which they shall be directed. Will they avoid becoming a selfish class struggle? Will they divide justly between the rights of the farmer and

the rights of other classes? Will the movements supported by agricultural sentiment be constructive in accordance with sound social and economic principles, and will farmers hold a steady and well-balanced mind at those times when seasonal conditions cause discouragement or bad markets arouse feeling of resentment, often irrational, against what is asserted to be the oppression of financial and commercial interests, or the alleged sins of party government?

If we may trust the lessons of past experience, our only assurance of an affirmative answer to these questions is to be found in wise leadership. Viscount Bryce, that clear-visioned student of human affairs, in his opening address at Williamstown, stressed the question of leadership. His attitude was to warn us against an "idolatrous belief in the automatic virtue and unlimited excellence of a democracy." Joseph Conrad does not appear to be entirely rational when he asserts that "the mass of the people are saner and sounder than those who assume to guide them" and that in certain great essentials "the people in the mass are always better than their leaders." The ambitious efforts of the farming people, democratic in character, need leadership not only in high places, but in community life, in order that the general mind may support wise policies. It should be something more than leadership moved by political expediency; it should be the leadership of unselfishness actuated by a high resolve to promote the welfare of the rural people; a well equipped leadership, rising in the centers of its influence to the level of agricultural statesmanship.

Not long since, a newly elected university president, referring in his inaugural address to State colleges and universities, characterized them as "a democracy educating itself." To what extent is democracy using the institutions it is supporting to prepare leaders for the agricultural class, especially in those social and business relations so rapidly coming to the front? Are the colleges being adjusted to the new demands? A consideration of this question requires that we agree upon what the agricultural college should accomplish for its students in preparing them for future leadership.

There appears to be no uncertainty in the mind of Secretary Hughes as to one thing college education should accomplish. In his address before the National Education Association, he declared that democracy "needs men trained to think, whose mental muscles are hard with toil." He specified "better mental discipline" as a requisite in the trying times of today, and suggests the classics and mathematics as the educational tools best adapted to that end. There can be no exceptions in the application of these general truths. The value of disciplined minds is not reserved to the professional classes. Such minds are a saving factor in all human activities and relations.

When it comes to a selection of the educational tools best suited to mental discipline, differences of opinion will appear. We may accept as a general principle, however, that those studies have disciplinary value in the measure that they require mind concentration, hard mental effort and that their selection would be within the range of such subjects as language, mathematics, philosophy, social and economic relations, and the fundamental sciences pure and applied, having especial reference, of course, to those subjects directly important to the agricultural people. It is true that many psychologists, perhaps all, reject the idea of general mental discipline

from an exercise of the mind in a single direction. They assert that mental toil in mathematics, for instance, gives discipline only in that field or in such fields as are covered by mathematical lines and has no general reaction on the mind. If the psychologists are right, the advice of the distinguished statesman still holds, and there is every reason why specific and severe mental toil should now be imposed in those subjects related to agriculture, such as the principles of government, the sociology of rural life, the economics of agricultural production and distribution, the organization and methods of finance and general business relations, not neglecting the idealism of individual and community life. If history teaches us anything as to the basis on which the civic and economic structure of a democracy may safely be reared and maintained, such knowledge should have become the definite possession of the college graduate. It is unfortunate if this knowledge is not imparted or, if under the guise of academic freedom, the student is so instructed that he comes to regard the affairs of the world as all wrong and must be radically reformed before anything is right, or if he is left intellectually stranded in a maze of theory and speculation. It is especially important that such instruction, or any instruction for that matter, shall be something more than popular dilutions. Extension teaching is out of place in the college classrooms.

The mention of finance brings to mind what on good authority is said to have happened during the war in one of our richest agricultural States, 63 percent of the population of which is rural. Under the impulse of war time prosperity, the people of the State bought land out of reason and also invested in bad securities to the extent of not less than two hundred million dollars. Now the Government is irrationally blamed for the resulting financial distress.

This raises the query whether the agricultural graduates of that State, or any State, who go back to mingle with their communities have been given a clear vision in matters of finance, the banking system and the relation of the farmer to it, some knowledge of farm credits and what constitute the differences between good and unsafe securities. It is to be hoped they have. But if not, is not such instruction good business discipline and do not existing conditions call for it?

It is difficult to agree with the opinion said to have been uttered by a university president, that a study of practical poultry keeping is as disciplinary as any other subject. On the contrary, I now contend that to absorb the time of a *mentally capable* undergraduate to any considerable extent with corn judging, cattle judging, judging at fairs, pruning trees, picking and packing fruit, and butter and cheese making is cheating him out of his intellectual rights and privileges, and is to that extent a failure to give him the best possible college preparation for an efficient service in agricultural affairs. Such exercises belong to the apprenticeship of practice and not to the period which should be devoted to mind culture and to teaching "such branches of learning as are related to agriculture and the mechanic arts, not excluding other scientific and classical subjects." If the ultra practical is excluded from the curriculum, more time could be given to a study of subjects which have a much higher disciplinary, or even practical value, especially those human and economic relations with which the rural people are now so intimately concerned. Do not fail to note the phrase, "mentally and morally fit." It is used advisedly. Many



young men enter college who are lacking in the intellectual and moral impulses which alone justify their presence in the college classroom. Why should the Nation and State waste their resources on such poor material? Can it be avoided? This is a problem for the future.

But it is urged, "Perhaps your point of view is all right for leaders in research, teaching and public service. What about the young man who plans to engage in practical agriculture." The answer is that the great need of the farmer today is to understand how his social and business environment and the facts and forces of the physical world react on his welfare, and the four years of college life are more than needed to accomplish this. The larger vision is not attained when so much time is given to small and relatively unimportant details.

Listen to the opinions of those whom we may regard as qualified to speak:

Professor Roberts, the first professor of agriculture at Cornell University, a man of practical wisdom, whom we called a philosopher, once said, "I have about concluded that if I had a son to prepare for a farmer's life, I would give him a stiff general training and let him learn farm practice by practicing it."

Mr. Schwab, whose experiences with men entitle his opinions to great respect, has stated that he desires young men to enter his shops with a knowledge of language, mathematics, and history, and he would see to it that they learn their trade.

In an article lately appearing in the *Independent*, a well-known Wisconsin dairyman is quoted as saying, "I did not take the agricultural course, but a general one. . . . My horizon has a wider sweep than that confined within the limits of a stanchion. I have specialized in fundamental principles." The author of this article, who was a student in a prominent agricultural college, falls in with the unmistakable trend of thought at the present time and argues for a more liberal course of study for agricultural students.

Men engaged in extension work have frequently deplored to me their lack of a knowledge of fundamentals. It is significant that in another field of vocational education, the engineering, the trend of opinion on the part of many leading teachers is strongly toward giving a larger proportion of attention to the principles underlying engineering education.

It is hoped that what has been said will not be regarded as antagonistic to vocational education, but rather as the expression of a conviction that the four years of college life are set apart for developing high ideals, intellectual vision and imparting fundamental knowledge, a period not to be invaded by the simple details of practice.

Your attention is called briefly to one more consideration. We are in the flood tide of commercialism. Our educational agencies from the high school, with instruction in typewriting, to the university, with a course in salesmanship, are attempting to develop money earning capacity. It can not be successfully denied that the idealism so essential to the best interests of community and national life is more or less overshadowed in school and college education by the attention given to industrial and commercial aims. How is it with the colleges of agriculture? Are they in spirit and influence distinctly idealistic or are they so dominated by considerations of vocational efficiency as to exclude the exaltation of moral

and spiritual attainments? A democracy may well insist that those of its number who dictate the policies of its higher education shall give full recognition to those personal and civic virtues which are the only basis of good government and social order.

Your charitable consideration is asked if this discussion has dealt with the obvious or with policies and conditions already attained. However this may be, let us hold fast to the truth, exemplified by all human experience, that the great essential in the education which best fits a man for an efficient life service, whatever the field in which the service is rendered, is the cultivation of the intellectual and spiritual faculties.

**THE VICE-PRESIDENT.** We are all greatly indebted to Dr. Jordan for this illuminating address.

The next matter on the program will be a report of the Committee on Instruction in Agriculture, Home Economics and Mechanic Arts, by Dr. A. C. True.

**A. C. TRUE.** I wish to say that the committee greatly appreciates the cooperation which it has had from the officers of the colleges in collecting the data for the report. I also personally wish to express my appreciation of the good work which the other members of the committee have done. We have also continued to have the able services of Professor Dick J. Crosby of New York State College of Agriculture, who has been employed by the States Relations Service to collect and summarize the data for the report and to prepare a draft of the report for the consideration of the committee. This committee has worked now for three years on the general subject of the improvement of teaching. It is gratifying to note the interest that has been shown in its work. The subject is evidently attracting more and more attention in the colleges.

**REPORT OF COMMITTEE ON INSTRUCTION IN AGRICULTURE, HOME ECONOMICS,  
AND MECHANIC ARTS. METHODS FOR THE PROFESSIONAL IMPROVE-  
MENT, WHILE IN SERVICE, OF COLLEGE TEACHERS OF TECH-  
NICAL SUBJECTS**

This report, the twenty-fifth of the Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts, supplements the last two reports of the committee. Those reports dealt in a somewhat general way with the improvement of college teaching in agriculture, home economics, and engineering, this, in a much more specific way, with the professional improvement of college teachers of these technical subjects. Those reports considered all efforts for the improvement of college teaching in the technical branches, this is limited to opportunities and activities within the college where and while the teacher is engaged in his regular work.

The information upon which the report is based is largely derived from replies to a letter of inquiry addressed to the presidents of the land-grant colleges. In this letter the presidents were asked to limit their replies rather narrowly to considerations bearing on (1) means employed to encourage the professional improvement of teachers of agriculture, home economics, and engineering subjects while actively employed, and (2) practices with reference to assigning work to young teachers as between subjects narrowly specialized and those of a more general character.

#### PROFESSIONAL COURSES AVAILABLE TO COLLEGE TEACHERS

The committee finds that all of the land-grant colleges have departments that offer courses in psychology, educational psychology, methods of teaching, and other professional studies for teachers. Replies from 43 States indicate that 40 of the land-grant colleges offer courses in psychology; 36, methods of teaching; 34, methods in agriculture; 29, methods in home economics; and 10, methods in engineering. In addition some of the colleges offer other professional courses, such as agricultural education, principles of teaching, general methods, methods in trades and industries, methods in farm shop work, measurement, and visual instruction.

From this it will appear that all of the land-grant colleges offer courses in a sufficient number and variety of studies in education to form a good background for the professional training of their teachers of agriculture, home economics, and engineering, but whether these courses are in all cases available to such teachers is not so apparent. As a matter of fact, they are sometimes not within reach; they are taught but not available to resident teachers in service. This condition is found most frequently in the smaller colleges where the facilities for graduate study are meager and the departments of education are barely able to carry the work necessary to meet the minimum requirements for training vocational teachers. Under such conditions the teachers of technical subjects who are without previous training in education and who wish to get this professional point of view can get little help from their own colleges; they often find it better, and sometimes even more convenient, to take time off and go to some other institution for study. Some of the land-grant colleges make it a policy to encourage their teachers to pursue graduate study in other institutions than the one in which they are teaching.

Why professional subjects in education may be taught in an institution and yet not be available to members of the faculty of that institution can be accounted for in several ways. In some cases the courses may be organized and conducted exclusively for undergraduates, or it may be contrary to the policy of the college to permit members of the faculty to attend classes with undergraduates or even to do graduate work while teaching, or one's schedule as a teacher may conflict with his schedule as a student.

On the other hand, there are relatively few land-grant colleges in which it would be impossible for members of the teaching staff to become students in courses in education, especially if they are willing to take such courses with undergraduate students. In answer to the question, "Are your college teachers of technical subjects permitted and encouraged to pursue graduate work while in service?", 38 of the replies was affirmative and only 7 negative. Apparently "the spirit is willing, though the flesh be weak." It is also a matter of record that within the past two years 147 teachers of technical subjects in 20 of the land-grant colleges have taken courses in education while in service.

#### THE TEACHING LOAD AND SALARY ADJUSTMENT

The teaching load and the salary adjustment are other factors that have an important bearing upon the extra work done for professional improvement. The normal full-time teaching load in hours a week is re-

ported as varying from 9 to 37 hours. The median load is nearly 16 hours. One president reports 9 hours as the normal load, 7 report 15 hours, 5 report 16 hours, 6 report 18 hours, and 3 report 24, 35, and 37 hours respectively. The load for those doing half-time graduate work has a range of from 6 to 12 hours, with a median a little above  $7\frac{1}{2}$  hours. In the case of teaching loads running as high as 24, 35, and 37 hours the work has been largely, if not wholly, laboratory or shop work, and we suspect that in such cases the reports made to the committee have been in terms of clock hours instead of semester credit hours. However this may be, the fact remains that the number of hours that teachers of technical subjects must spend in classrooms and laboratories, to say nothing of the demands of research and extension work, is relatively high, and this adds to the difficulty of arranging a daily program that will provide for professional improvement.

The salary arrangement for those doing part time graduate work is, on the face of the returns, surprisingly liberal. Only 9 institutions report half-pay, while 20 report full pay for such persons. Some report that they have not yet had to meet the problem, others that no rule has been adopted but each case is adjusted as it comes up. In other colleges, upper limits for graduate work on full pay are fixed. In Nebraska, for example, a teacher may take 4 hours of graduate work without loss of pay; in Ohio he may devote one-third of his time to graduate work; in Texas he may not take more than one minor subject in any one term; in Utah more than half of the college teachers of technical subjects are reported to take 3 to 5 hours of graduate work every quarter on full pay.

But the taking of courses and the doing of graduate work may be for technical rather than professional improvement, and so the reports on salary adjustments and teaching loads are pertinent to this discussion only as indications of the opportunities and encouragement given to professional improvement. Nor is the taking of courses in education the only way for a teacher to employ leisure time for professional improvement. He may read, observe the teaching of others, meet in conference with others, seek the advice of more experienced or better trained teachers, and on the basis of knowledge thus gained become his own severe critic. In his search for better methods he may also receive much help from his college, particularly from a well-functioning department of education.

#### EDUCATION DEPARTMENTS BEGINNING TO HELP

At the present time not many of the education departments in the land-grant colleges are functioning strongly as service departments for the improvement of the teaching methods in their respective institutions. Some of them undoubtedly do not consider this one of their important functions; others do. In the case of the latter, several considerations might easily have delayed the full fruition of their hopes in influencing the methods of their fellow teachers in technical departments. For example, most of the education departments are young and have yet to prove themselves among the older, well-established departments. With the best of intentions, they may, nevertheless, hesitate to offer advice and assistance that one dean of education says "would have been scornfully rejected." Furthermore, most of these departments were established for the express pur-

pose of training teachers of vocational subjects for secondary schools and their tasks in this field have been so heavy as to preclude their doing much else.

But notwithstanding heavy teaching schedules and other duties, some 20 of the education departments have been helpful in a professional way to teachers of technical subjects in agriculture, home economics, and engineering. Sixteen college presidents report that their education departments have helped teachers in other departments by giving personal advice and assistance, and 21 report that members of their education departments have taken part in group discussions on methods of teaching and in some cases have held teaching seminars regularly. They have also taken part in faculty meetings devoted to the discussion of methods, in conferences with department heads and, in one case (Utah), in weekly meetings on methods. On the other hand, they have not been called upon to any great extent to analyze methods of teaching in technical departments. This is the first step in a procedure recommended to this association at its Springfield meeting in 1920 by W. W. Charters and used by him in teaching classes of young college instructors. Essentially the method is to "determine the difficulties of the young college instructor, collect the methods of handling these as worked out by excellent college teachers, and interpret them in terms of the principles of psychology and philosophy.<sup>1</sup>

Asked to describe other ways in which efforts have been made to provide professional training for teachers of technical subjects while in service, the presidents mentioned a number of things. Twenty-three of them have brought in outside lecturers on educational subjects and some make this a regular practice. Professor Kilpatrick of Columbia has given series of lectures on methods at Ohio, New Hampshire, Pennsylvania, Purdue and by this time probably elsewhere. Professor McMurry of Columbia and Dean Charters of Carnegie Institute of Technology have also lectured on methods at some of the land-grant colleges. In 16 institutions teachers may study in summer school without going away from home. In 5 of the colleges supervision by successful teachers having professional training is under trial. In Oregon, for example, we are told that the work of teachers is closely supervised by heads of departments, especially in agriculture, home economics and civil engineering.

Efforts to improve the professional training of teachers of technical subjects in the land-grant colleges have undoubtedly been going on for many years, but the attention now given to the improvement of methods is of much more recent origin and in many cases are closely coordinate with the establishment of departments of education following the enactment of the Smith-Hughes Act. In fact, some of the administrative officers who have replied to the committee's questions frankly say that not much has been accomplished as yet because their departments are of recent origin and have not had time to accomplish much. This situation, however, is not general.

#### RESULTS BECOMING APPARENT

In reply to a question as to the specific results of efforts to improve methods of teaching, 15 college presidents have given replies indicating definite improvement. They mention improved curricula, better profes-

<sup>1</sup> The Improvement of College Teaching (School and Society, 13 [1921], No. 330, p. 494).

sional spirit and morale, better methods, and better distribution of marks, with fewer failures on the part of students. One reports the discussion method of teaching as largely superseding the lecture, while another has observed a much closer analysis of the requirements of students. The following excerpts are taken from replies to the committee's question:

"In agriculture the combined lecture-recitation-quiz method is used instead of adhering to one or the other method, increasing student interest. A standardization of results to be obtained has been worked out for clothing and textiles, in order to secure a criterion for grading laboratory work. Outlines have been prepared for laboratory courses which give uniform material for all sections of a course and the correct gradations and correlations for courses in sequence and in relation to others in the curriculum."

"The educational analysis by schedule, which is prepared by the faculty of the college of education, has caused most instructors to study their own methods of classroom instruction."

"No special results, except that individual members of faculty have taken half years and full years off to complete next step towards advanced degrees."

"An increased interest in psychological methods and a tendency to make use of them in the classroom."

A reduction in quantity and a corresponding increase of quality.

A greater use of the project method.

More interest in the subject of method.

More interest in the problem of grading or marking."

"Programs more regular; universally higher grades; fewer disqualified students."

"More interested in teaching. A better morale, a better appreciation of the work of the teacher."

"In agriculture awakened interest, more attention to methods and contents of courses."

"I consider that teaching methods have improved somewhat, primarily through interest of individuals and heads of departments."

"We have a branch of the Society for the Promotion of Engineering Education in the university."

"Promotion of the study of method and a modification of form of routine teaching by means of the small group conference."

"Increased interest—fewer failures."

"Concentration of attention of staff on question of effectiveness of teaching. An increased interest in and respect for professional work. A more thoughtful selection of content for courses and a better planning of curricula. A better balanced grading of students (apparently)."

"Methods improved; scholarship standards raised."

"Measurable improvement in the functioning knowledge the student has as the result of marked changes in certain courses."

"A closer scrutiny of teaching methods and an increased desire in the instructors to teach subjects in a manner satisfactory to the work of the service."

"Courses of study improved; classroom work made more attractive and efficient; laboratory work made more practical and efficient."

"General improvement recognized. In agriculture the 'discussion method' is displacing lectures. In home economics a noticeable improvement in student ideals, in work accomplished and in number of requests for teachers to speak at public meetings."

"A closer analysis of the requirements of the student."

"Better distribution of teachers' marks. Perhaps more attention given to methods of instruction. More attention given to exceptionally strong students."

"Better professional spirit and ambition for advancement."

"Probably slight. Very little consciously-directed effort has thus far been made."

"No measurable results."

"Better instruction in freshman and sophomore work."

Another indication of the results of recent agitation and discussion for better professional training and more attention to methods of teaching is found in the attitude of administrative officials themselves toward these matters. In one college where not much organized effort has been made as yet to direct the attention of the faculty to better methods, this condition is reported:

"Progress has been made in that a receptive attitude on the part of technical teachers has been created."

#### PROFESSIONAL TRAINING REQUIREMENTS

That a receptive attitude toward professional training is becoming generally apparent is indicated by the replies to a question as to whether candidates for teaching positions in the technical branches are required to have professional training. To this question there were 11 affirmative replies, of which 6 specified the requirement for home economics teachers and one for engineering teachers. There were 36 negative replies, although many of these were qualified by such phrases as "not yet," "impossible as yet," and the like. Among those replying that professional training is not required, were 7 who reported that they are planning to require it; 4, that it is desirable; 3, that they seek candidates with professional training. Counting these with the institutions that already have professional requirements, 36 percent of the institutions may be said to stand on the side of definite professional training.

As indicating the character and amount of training prescribed by institutions that have already set standards, the following examples are given:

Florida requires psychology in one or more three-hour courses running throughout the year.

Purdue reports that in home economics it selects instructors from schools that have required courses in education.

At the University of Minnesota, home economics instructors are required to have from 12 to 15 semester hours in education.

In Montana, 18 quarter credits are required.

In New Jersey and North Dakota, 24 semester hours are required.

In Oklahoma, home economics instructors must have 20 hours.

In Pennsylvania, home economics instructors must have two years of professional training and two years of experience.

Rhode Island reports no professional educational requirements at present, but states that "by action of the board of managers and the State Board of Education, all future teachers here will be required to hold or to secure from the State a professorial, instructional or tutorial certificate."

As bearing on the development of an efficient teaching staff, the presidents were asked what practices they followed in assigning work to young instructors, that is, did they give them relatively broad general subjects to teach or narrowly specialized subjects, or did they seek to develop breadth of knowledge and experience by changing the assignments from term to term.

The replies indicated a lack of uniformity in practice and a wide divergence of opinion. Seventeen indicated a preference for the assignment of broad general subjects to young instructors, and 14 took the side of narrowly specialized subjects, but the practice by no means followed the preference. Several statements were to the effect that young instructors were not made responsible for teaching any subject; they must first serve apprenticeships in classroom and laboratory.

The reasons given for preferring one practice or the other were strangely contradictory. Some indicated a preference for assigning broad general subjects because it would be better for the development of the instructors and some gave exactly the same reasons for assigning narrow subjects. Some agreed that because broad subjects were also more elementary they should be taught by the older, more experienced teachers, because such teachers should be in charge of freshmen.

#### RECOMMENDATIONS

The committee recommends:

(1) That the Association of Land-Grant Colleges declare this year in favor of professional training for college teachers.

(2) That beginning this year the land-grant colleges make particular efforts to improve their methods of teaching by some special means best suited to their respective facilities.

(3) That a number of colleges having strong departments of education offer immediately professional courses for graduate students preparing for college teaching, including the development of graduate work with special emphasis on its application to the technical fields of agriculture, home economics and engineering.

(4) That until such time as courses in methods of college teaching can be made readily available to teachers of technical subjects, these teachers be permitted and encouraged to avail themselves of such courses in educational psychology and the principles of teaching as are readily accessible, even though these courses are not designed primarily to meet the needs of college teachers.

(5) That the institutions with well established departments of education make an effort to offer strong summer courses, so that members of the teacher-training staffs in other colleges may be given opportunity to pursue special work in these colleges.

We believe and urge further:

(6) That greater use should be made of departments of education and that these departments should become service departments in connection with the instructional work of land-grant colleges, as well as training departments for teachers.

(7) That the land-grant colleges make definite and liberal arrangements for professional training of teachers in service and urge such teachers to take professional courses at summer schools or elsewhere for at least two successive years.

(8) That instructors in the technical departments be urged to pursue graduate work in education with particular emphasis on research in some problem of teaching in their technical fields.

(9) That frequent conferences should be held of teachers handling the same or related subjects. These conferences should aid in developing esprit



de corps among the instructors, in improving teaching methods, in considering text-books, in revising schedules of assignment and in scrutinizing teaching content.

(10) That much attention should be given by the heads of departments to guiding younger teachers. Under careful supervision beginners in teaching should be given opportunity to teach a variety of subjects, thus broadening the horizon of their interests.

(11) That experienced and successful teachers should have charge of and take part in teaching introductory and basis courses.

(12) That beginning with 1925, candidates for teaching positions in land-grant colleges be required to have at least six semester hours of professional training, including courses in educational psychology and methods of teaching. As soon as practicable this requirement should be increased.

A. C. TRUE,  
T. D. BOYD,  
ALFRED VIVIAN,  
BERTHA M. TERRILL,  
A. A. POTTER,  
G. A. WORKS,  
ANNA E. RICHARDSON,  
MARY E. SWEENEY,  
F. E. TURNEAURE,

*Committee.*

It was moved and seconded, that the report be received and printed, and that the association approve the recommendations of the committee and recommend to the Executive Body that these recommendations be adopted.

The motion was agreed to.

For action of the Executive Body, see p. 367.

#### STATUS OF THE PURNELL BILL

**THE VICE-PRESIDENT.** Among the important matters now before this association and before Congress is the Purnell bill, which provides for additional support for agricultural research and will give to the agricultural experiment stations greater opportunity for investigation, particularly of the economic phases of agriculture. Director G. I. Christie of the Indiana Experiment Station, who has been in very close contact with the progress of the bill, will now explain its present status.

**G. I. CHRISTIE.** It is hardly necessary to recite some of the facts with reference to the Purnell bill, since most of you have kept closely in touch with it. The bill was first introduced by Mr. Purnell of Indiana in the 66th Congress. It was reintroduced about April, 1922, in the 67th Congress, and is now before the Committee on Agriculture.

It seemed to Mr. Purnell that arrangements should be made to have a full hearing on this bill at a time when the people would be especially interested, and the committee was in a position to give consideration. We have kept in touch with Mr. Purnell through the Executive Committee of the association.

At the time of the President's agricultural conference held in January, 1922, President Pearson of Iowa, Dean Mann of New York and others of the Executive Committee, arranged with Mr. Purnell to have representatives of the four western States, who were here at that time, to go before the Committee on Agriculture and discuss the Purnell bill. Dean Mann, Dean Hunt of California, Dean Knapp of Arizona, Dean Jardine of Oregon, and the speaker made a statement with reference to the bill. On February 23, 24, and 25, at the request of the Executive Committee, Dean Mann, Dean Russell of Wisconsin, Dean Farrell of Kansas, President Morgan of Tennessee, Gray Silver of the American Farm Bureau Federation, President Woods of Maryland, and the speaker appeared before the Committee on Agriculture and presented facts on the needs of the experiment stations.

This committee received a most sympathetic hearing on the part of the Committee on Agriculture. The hearings were well attended by the members of the committee. The questions asked were all sympathetic. There was no spirit of antagonism or opposition, and we felt that we had accomplished a good piece of work in placing this whole matter before the Committee on Agriculture.

These hearings, of course, have been printed, and I think most of you have had a copy of them.

Following that hearing, the Committee on Agriculture considered reporting the bill to Congress. It was felt that because of so many appropriation bills then before Congress, and because of the attitude of the administration against further appropriations, it would perhaps not be expedient and in order to place this bill upon the calendar, the Committee on Agriculture, with this in mind withheld action on the bill. It is now before that committee awaiting action at an opportune moment.

It was our feeling, from statements from the Committee on Agriculture, that the members were ready to report the bill out favorably. From what I could learn, if the bill had been voted upon immediately following these hearings, it would have had an almost unanimous approval upon the part of the committee. That gives you the standing of the bill up to this time. The question now is on the future.

The question of appropriations is just about the same as it was then. Congress is pledged to economy. Congress is pledged to hold to a minimum appropriations of money, and the members are not going to look with favor upon bills that call for appropriations.

On the other hand, Congress has pledged itself to assist agriculture. Our President has stated repeatedly, and has emphasized it again within the past few days, that he is ready to recommend to Congress any measure that will help the farmers in any way out of the present predicament. Of course, you and I are biased, but I think there is no one thing that Congress could do that would do more to help the agricultural situation, not only of tomorrow and the very near future, but the situation of years to come, than to give an appropriation to the agricultural experiment stations in order that they may help the farmers with some of these fundamental problems.

Now the criticism has been made before this body several times in this meeting, that if one asks the agricultural colleges for information on the subject of agricultural economics, the amount of material they will give you in return is so small that it indicates they have little on the sub-

ject. I do not agree with the broad statement that has been made with reference to the absolute absence of information on economic problems in the agricultural experiment stations of this country. The majority of the activities that are successfully operating today, in the way of cooperative marketing, have been guided by agricultural experiment stations and agricultural college men. It is not in place to laud our experiment stations or agricultural colleges for the large fund of information which they have along this line, because they are weak. We will admit it. We will admit that it has been impossible for the institutions to give any large amount of attention to this line of work. But our institutions are in a position to render a great and valuable service along these lines if they had funds to carry forward investigations.

It is noticeable that the experiment stations have started a large number of projects. The men have recognized the many problems and the great need for fundamental investigation. On account of lack of funds it has been impossible to complete the work. In our own experiment station for a long number of years we have worked with reduced funds. Men were doing real, conscientious work, but they did not have the necessary funds to follow up and complete the projects. Within the last two years we have had a small increase in the funds for our experiment station and we are now getting results from the station work such as we have not had for a long time. This is true with regard to every other experiment station in the country.

It was my pleasure to visit seven of the experiment stations in the southwestern States this past summer. I found some important and urgent problems in that western country. There is great need for investigations on range management and development and the great livestock industry of the country. The experiment stations, with the exception of one or two, are wholly unable to take any part in this great work.

The Forest Service has undertaken some worthwhile investigations. They have asked for the cooperation of the State experiment stations, but it is impossible for those experiment stations to give assistance because of the absolute lack of funds. A great work can be done for the livestock industry of this country by the experiment stations of those States if they could have a little money.

The same thing is true in the South. The projects there connected with the crops and the fundamental problems of agriculture are being carried on largely by the United States Department of Agriculture because those States do not have the funds which allow them to participate and take part in the great problems right at their own doors.

We have been handicapped a little in the last few years because of the development of the extension service. The extension service was developed with the understanding that in the experiment stations and the Department of Agriculture of the United States there was a vast fund of information available for the farmer, if only some agency might be organized to carry it to him. The extension workers have organized their projects and have accomplished a great work. However, those people who felt that they had plenty to offer the farmer for years to come are the very ones who are returning to the experiment stations and the Department of Agriculture and saying, "We certainly need help! Unless you can give us the answer to this and that and the other question, and back it up with facts, agri-

cultural extension work can not go forward." And so the experiment station needs help in order to meet this urgent demand.

Something should be done at an early time to bring the Purnell Bill to the attention of Congress. The Executive Committee should give serious consideration to methods of advancing this measure. We must also do more to get the support of the people at home.

The Purnell Bill has the support of the farmers. Mr. Howard of the American Farm Bureau Federation was with the committee when we asked Mr. Purnell to introduce this bill, and voiced the approval of that organization and its members.

When the hearings were held last February, Mr. Gray Silver of the Farm Bureau Federation appeared and made a statement on behalf of the federation. At our meeting Tuesday night, Mr. Howard took occasion to express appreciation of the great work of the experiment stations and agreed to help all these institutions, saying that the farmers demanded help and wanted it now. If that is the attitude of the farmers, then it is your business and mine to see that the farmers speak on this question. If the farmers will speak in the way that they should and in the way they have spoken on other measures, then there will be no question about the attitude of Congress on the Purnell Experiment Station Bill. This is not new legislation. This is simply helping to do better work that Congress authorized a number of years ago, a fundamental work that is back of the teachings of the colleges and the practices on the farm and in the home. With that knowledge before the administration and in the minds of Congress and with the understanding that this is an investment in the basic agricultural industry, the Purnell Bill should have early attention and strong support.

#### THE WHEAT SITUATION IN THE NORTHERN GREAT PLAINS AREA

**THE VICE-PRESIDENT.** The Department of Agriculture some time ago, realizing the importance of certain agricultural questions, called special conferences of those concerned with the wheat situation among others. It gives me great pleasure to present Dr. Carleton R. Ball, head of the cereal investigations of the Department of Agriculture, who will discuss the wheat situation in the Northern Great Plains Area.

**CARLETON R. BALL.** This is a very unexpected pleasure, but a very real one, nevertheless. I have here some graphs that I think will serve to illuminate the problems of the wheat crop.

Spring wheat, about one-third of our total acreage, between twenty and twenty-five millions of acres, is chiefly in the north-central part of the country, while winter wheat is chiefly in the central and east-central portions of the United States, and comprises from forty to forty-five millions of acres annually.

Now, the wheat crop has certain relations and problems which make it very important. In the first place, it is grown by more than two million farmers in this country. In other words, one man out of every fifty men, women, and children in the whole United States is a grower of wheat. For many of these farmers it is the principal cash crop. In the second place, everybody eats wheat. It is our principal food crop. One hundred and ten millions of us are eating wheat. That is the chief indoor sport of the

American people. In the third place, it is by far the dominant crop of the area I am going to discuss and without it those farmers are lost.

The percentage of farmers who grow wheat, of all farmers, varies from about zero in States like Florida and Louisiana to more than 80 percent in the chief wheat-growing States like North Dakota and Kansas and parts of Montana, Minnesota, South Dakota and other States. Now, anything that affects a crop of that size and commercial importance and of that value as a food stuff, is a tremendously important problem in the United States.

In the growing of the winter wheat crop there is one element of tremendous uncertainty. We ordinarily call it winter-killing. Winter-killing is not always a question of temperature, by any means. It does not mean that the wheat is frozen to death. Very frequently the largest losses from winter-killing are losses from winter drought. They take place not from low temperatures, but from lack of moisture in the soil and lack of snow cover for the wheat. Those are the hazards in winter-wheat growing, and, in 1917, as I remember, a little more than 30 percent of the total acreage of winter wheat was destroyed by one or another of these winter conditions. This is a great hazard for farmers who are growing forty to fifty million acres of the winter crop annually for us to eat and for our neighbors in other countries to consume.

When we come to the spring wheat crop, we meet with another entirely different but equally destructive set of conditions. A study of the westward progress of spring wheat growing in the western group of North-Central States, Minnesota, North Dakota, South Dakota, Montana, and Wyoming, from 1889 to 1919, by 10-year periods, shows that, during that 30-year period, wheat-growing was moving out steadily on to land which was drier and drier so far as the annual rainfall is concerned. It is an area in which summer droughts are of rather frequent occurrence, and where other things dangerous to the wheat crop, like stem rust, have developed at periodic intervals.

Figure 1 gives a picture of the trend of each of the farm crops grown in Minnesota, North Dakota, South Dakota, Montana, and Wyoming in terms of the percentage of each crop in the total acreage of all crops, including wild hay. The total acreage of all crops equals, of course, 100 percent. These facts are given by decades from 1879 to 1919, except for the two Dakotas, which were not separated in 1879. This is a very illuminating chart, prepared by Dr. W. J. Spillman of the Bureau of Agricultural Economics. It tells the progressive story of a group of States starting with a one-crop farming system, that crop being wheat.

In the three older States, the proportion of wheat in the total crop area has been decreasing steadily, while in the two newer States, Montana and Wyoming, it still is increasing as new dry-farmed areas are opened. The columns for the other crops show the endeavor of these older States to diversify their agriculture. The proportion of corn and rye in the total acreage is steadily increasing. The proportion of flax is decreasing, the proportion of oats slightly increasing, and the proportion of barley, which had been increasing steadily, shows a marked drop in the line for 1919. This, however, is not due so much to the effects of prohibition as to the

effect of the enormous wheat acreage of that year, under the stimulus of the fixed price existing when the crop was sown.

In the two new States the figures are complicated by the presence of irrigated areas. The most significant features are the rapid increase of wheat on new dry-farming areas, and the attempts to grow corn and rye. In the three older States the proportion of hay in total acreage tends to increase slightly with more diversified farming, while in the two newer States the proportion devoted to hay tends to decrease as the shift takes place from range conditions to farming.

**PERCENTAGE OF EACH CROP IN TOTAL ACREAGE OF ALL CROPS.**  
(Including Wild Hay.)

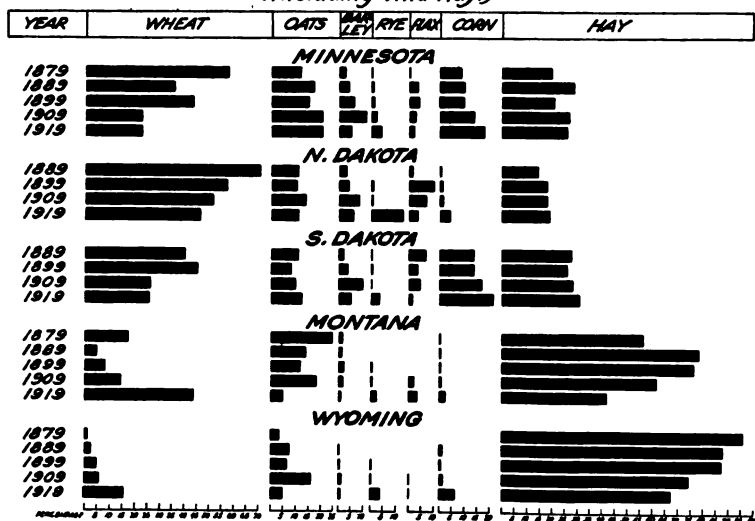


FIG. 1.—Trend of percentage production of farm crops in Minnesota, North Dakota, South Dakota, Montana, and Wyoming, 1879-1919.

The chief growing area for hard red spring wheat is comprised in the five States in figure 1. In those States and the adjacent States the problems of production, such as drought, rust, and weeds, have been growing more and more acute until they have attracted widespread attention, not only of the farmers and those interested in growing wheat, but of the great milling and grain-handling interests as well. All agencies desire to stabilize the situation with reference to losses which have been occurring from year to year and which, indeed, have threatened to remove the great milling industry in part from the area where it has been built up through a long series of years. I want to show you what has happened to the spring wheat crop in that group of States, through a series of years.

Figure 2 shows annual wheat acreage and acre yields in Minnesota in the 34 years from 1889 to 1922.

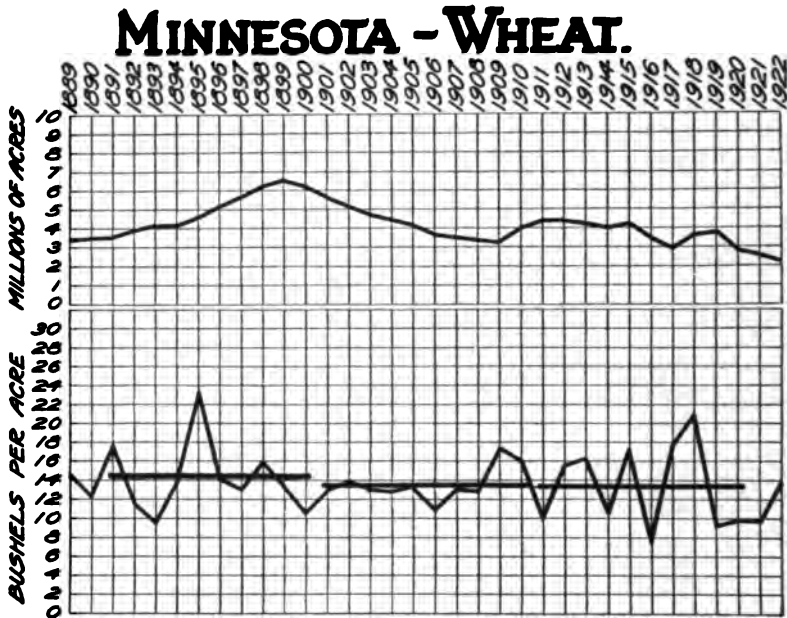


FIG. 2.—Annual acreage (upper curve) and annual acre yields (lower jagged curve) of wheat in Minnesota, 1889-1922, with average acre yields for three 10-year periods (lower horizontal lines).

The upper line is the curve of acreage. The lower jagged line is the curve of acre yield, and the horizontal lines are the average of those acre yields for three different 10-year periods. There is an interesting story in that State. It arrived at the highest point of acreage in 1899, with about 6,500,000 acres of wheat. It has gradually declined in total and percentage wheat acreage since that time, as oats, barley, rye, and corn have increased.

The three horizontal lines show 10-year average acre yields in three periods ending in 1900, 1910, and 1920, respectively. In the State of Minnesota these lines show that average acre yield is not increasing but has decreased slightly. This has been due in part to two very severe rust epidemics occurring in 1904 and 1916, respectively. The average acre yield of wheat in this country as a whole has risen steadily in the last 30 years. It is now nearly three bushels higher than it was at that time, in spite of the fact that wheat-growing has been extended, through a period of 30 or 40 years, out on to lands that are drier, where the hazard is greater and the average acre yield is less.

These facts are not to be counted against the agriculture of the State of Minnesota. They are the almost inevitable result, as you know, in any area in which a single crop system prevails. A decline in the proportionate acreage of that crop is a sign that diversification has been going forward and that the dangers of a single crop system have been steadily

eliminated as the years have passed. With the continued increase of diversification in Minnesota, and with the checking of rust epidemics by barberry eradication, the average acre yield of wheat in that State should increase.

Figure 3 shows the increase in the acreage of wheat in North Dakota, as the State became settled, and the shifts that now are taking place.

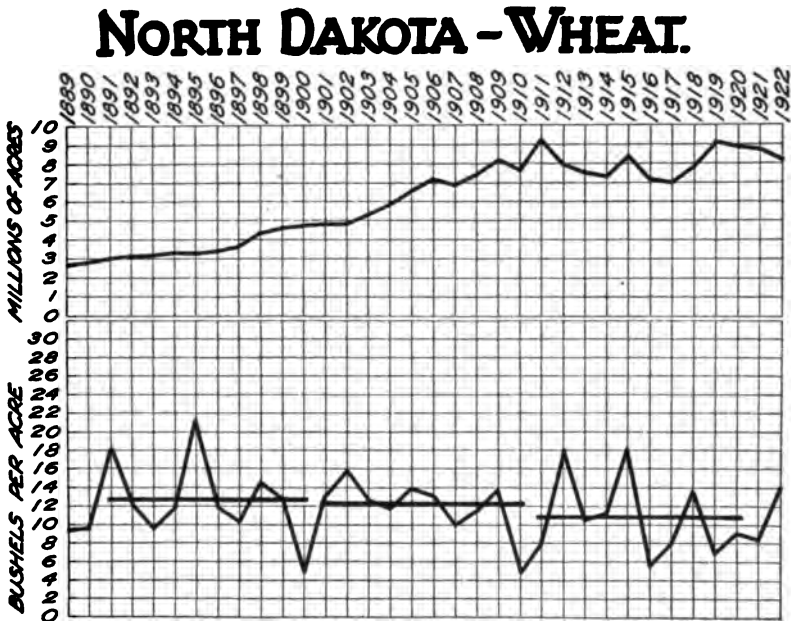


FIG. 3.—Annual acreage (upper curve) and annual acre yields (lower jagged curve) of wheat in North Dakota, 1889-1922, with average acre yields for three 10-year periods (lower horizontal lines).

North Dakota, being a newer State, has not progressed as far as has the State of Minnesota in diversifying its agriculture, partly because it is newer and partly because the difficulties of growing corn and other crops are greater than they are in the neighbor State. Here we see the same story, except that it is about 20 years later in the stage of development. The wheat acreage has been increased rather steadily until the last few years, when there has been a slight decline as the acreage of rye and corn has been increased. But the acre yield has shown a more marked decline than in Minnesota. There is an average drop of two bushels in the third decade as compared with the first 10-year period shown. That decline has been due, in part, I think, to the single cropping system, but more markedly, in this last 10-year period, to recurrent droughts as wheat-growing moved westward with new settlement, and also to recurrent rust epidemics, of which I shall speak a little later.



Figure 4 gives similar data for South Dakota.

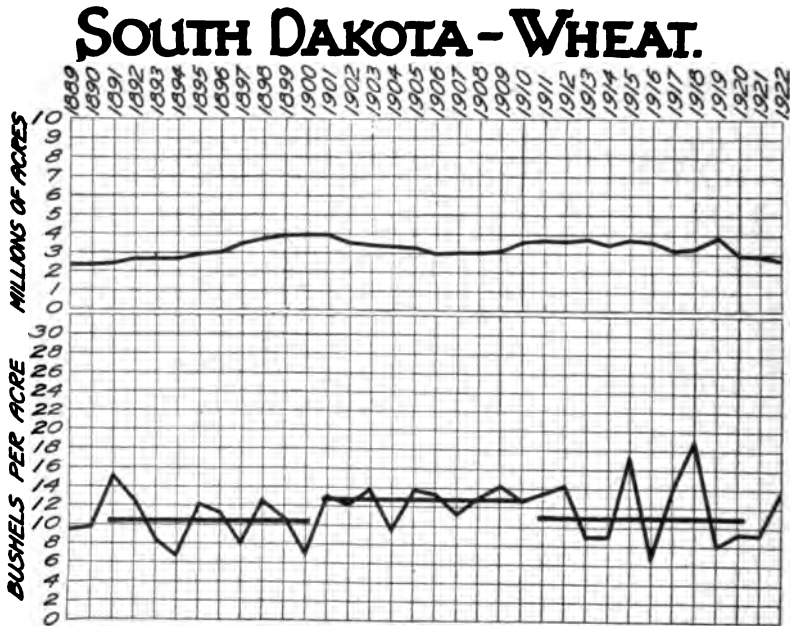


FIG. 4.—Annual acreage (upper curve) and annual acre yields (lower jagged curve) of wheat in South Dakota, 1889-1922, with average acre yields for three 10-year periods (lower horizontal lines).

The upper line shows a fairly steady acreage of wheat through a period of more than 25 years, the total area being between 3,000,000 and 4,000,000 acres. There has not been either a very large or marked increase or decrease in recent years.

The lower line shows the acre yield year by year. As in the other States it shows a wide variation in recent years. Notice the enormous variation in the acre yields shown there in the last ten or twelve years. The yield goes down to a little less than seven bushels in one year. That, I believe, is due to the heavy rust infection of 1916. In the three 10-year average yields the variation also is very marked. The combination of rust and drought has taken a heavy toll but even at that the average is slightly higher than in the 10 years from 1891 to 1900. These facts all serve to show the hazards of the wheat-growing farmer in this area and the need of the very best sort of interest and help, from every man who is interested from the agricultural or the commercial side, in stabilizing crop yields throughout this area.

Figure 5 shows the situation with reference to the State of Montana.

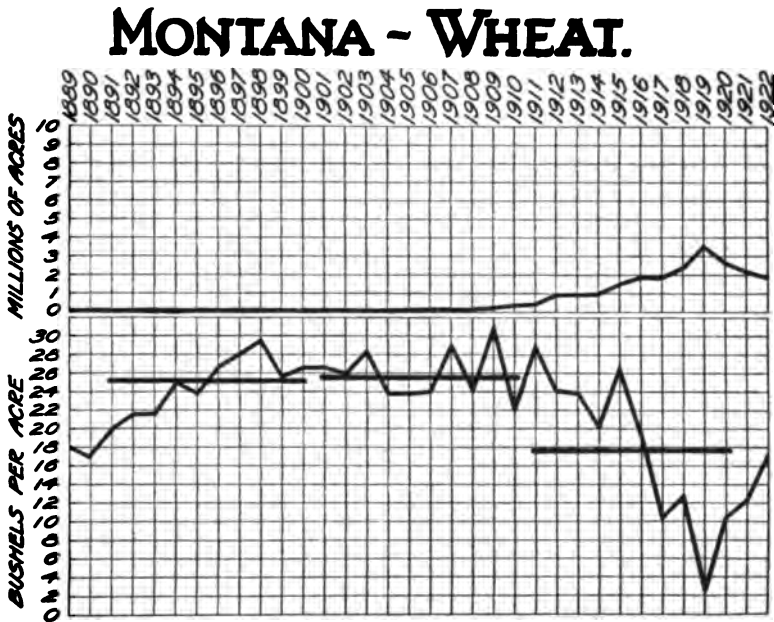


FIG. 5.—Annual acreage (upper curve) and annual acre yields (lower jagged curve) of wheat in Montana, 1889-1922, with average acre yields for three 10-year periods (lower horizontal lines).

Here we have a more striking story than in any other State, due in part to the fact that during the period of war the demand was for every bushel of wheat that the farmer could grow and much new dry land was broken and put in wheat. It is true that for Montana it is not possible to distinguish in this chart between wheat grown under irrigation and under dry land conditions, and as we come nearer to the year 1922 the percentage of wheat grown under irrigation rapidly decreases, while the total acreage enormously increases. But considering the average for the three 10-year periods, we have a still more startling story. We find there has been a tremendous drop in the average yield of dry land wheat, due chiefly to those extremely dry years through which the State has passed, and from which it is emerging very successfully at this time. The lowest yield shown there is only a little more than two bushels to the acre, in 1919, and there are other yields there that are pretty low. While the average yield for the last 10-year period is remarkably low as compared with the first two 10-year periods, it still is more than 17 bushels per acre.

Now those are the conditions under which the farmers of that region have been endeavoring to settle the country and pay for their farms and make homes for themselves and their children and educate their families properly. It has been a very severe test of the courage and staying powers of the farmers, and it is greatly to their credit that so many of them have been able to pull through. It is the spirit of the pioneers, and it is a chal-

lenge to scientific agriculture to meet the problem, and I believe it has been splendidly accepted by the representatives of all agencies concerned in the stabilization of the agriculture of that area.

Before I leave the subject I wish to show you what we are doing in driving the barberry out of those States. The total shaded area on the following map is the barberry eradication area:

***PROGRESS OF THE BARBERRY ERADICATION CAMPAIGN, 1918-22***



The black area is the area in which the barberry has been removed by the house-to-house survey in cities and towns and by the farm-to-farm survey in the country. We are getting well along with the first clean up, and there has not been a severe rust epidemic since the area got large enough to make its influence felt. The last very destructive one was in 1916. We lost about two hundred million bushels of wheat in this country and about one hundred million bushels in Canada. There was a total loss of over \$400,000,000 and we have spent, up to date, about \$1,000,000 getting those bushes out, so that we should have a credit at the bank, as I see it, of about \$399,000,000 yet, in the United States and Canada.

**STATUS OF ENGINEERING EXPERIMENT STATIONS AT LAND-GRANT COLLEGES.**

**THE VICE-PRESIDENT.** A few years ago President Riggs of South Carolina, in discussing the functions of a land-grant institution, compared it to a three-story building, the most important story being devoted to teaching, and emphasized the fact that this main story must be supported by research and must find expression in public activities and institutions.

In the agricultural wing of the land-grant college building, the three stories have been well balanced and well developed. On the other hand, in the engineering wing of the building, the instructional or middle story has been very well perfected up to date but, unfortunately, it has not been supported by research, and very little opportunity has been given to the

mechanic arts or engineering work of land-grant institutions to find expression in public activities involved in industry.

As most of you know, several attempts have been made to secure legislation to provide engineering experiment stations in connection with the land-grant institutions. Professor L. D. Crain of the State Agricultural College of Colorado, has kindly consented to give us a brief statement regarding the status of engineering experiment stations at the land-grant colleges.

L. D. CRAIN. As suggested by your chairman, in the land-grant institutions, little engineering research was carried on until the last four or five years, and the research during the earlier period was carried on largely by individual departments acting on their own initiative, and not connected up in any way with any set policy, as had been the research in agriculture. However, a few years ago it was deemed opportune to start the work in engineering research in such institutions as were in condition to give it support. Unfortunately for the engineering side of the land-grant institutions, we are not provided with funds in the same manner and in the same extent that you are on the agricultural side; I mean by grants or Federal appropriations. Consequently, we must depend entirely upon our general budget or upon the generosity of our States. In some States the legislature has been fairly generous in the amount of appropriations made for general experimentation in engineering, and in those cases the engineering stations have been developed to a very large extent, and a great deal of fine work has been done and is being done. In other States we have had to start on a smaller basis. We have had to conduct our work under very adverse circumstances; because, as you all know, it requires money, and lots of it, to carry on extensive work in engineering and experimentation. The cost of research in engineering is greater, I believe, on the whole, than of that in agricultural experimentation. Perhaps I am wrong in that, but at any rate it requires a great deal of money in order that we may do good, effective work.

Now we are attempting in the engineering experiment stations to serve the industries, just the same as you people are attempting to serve the farmers. Perhaps I ought to put it another way and say that we are doing it in the same general way that you are serving the farmers.

We are also recognizing this fact, or at least some of us, that there are engineering problems directly connected with the farm that require solution, that properly belong to the engineering experiment stations. That is particularly true in some of our middle west and western States, perhaps more so than in the eastern States, where the industries are the paramount question, and out west the agricultural interests are paramount. But even in the eastern States I dare say that you will find that agriculture is becoming more and more a problem for engineers. I do not necessarily mean the art of agriculture, the actual working of the soil, but I do mean that there are problems continually coming up on the farm that require the engineer. So that some of us, at least, are attempting in our engineering experiment station work to connect engineering, as much as we possibly can, with agriculture.

The engineering experiment stations are again in a rather peculiar situation, because many of the large industries, the individual corpora-

tions, have organized and are conducting experiment stations within their own fields, solving their own peculiar problems. That makes it rather hard, because some of them to whom we look for support say that the industries can solve their own problems. They point with considerable emphasis to such concerns as the Westinghouse Company, the General Electric Company, and other large corporations, saying that they are solving their own problems, and are asking, "Why should we appropriate money out the public treasury to support them when they are supporting themselves?" Consequently, you see it is a little bit hard, oftentimes, for us to get the requisite support for research in engineering. Now we must realize that the work that is being done by these individual or corporation experiment stations is a work that is peculiar to that particular line of industry, and not applicable, generally, to all lines of industry and, consequently there remains a very large field for the engineering experiment stations of the land-grant institutions to serve. If we can only get the appropriations necessary to organize our work and employ the right kind of investigators, we can continue to enlarge our research.

Now, that is the status of the engineering experiment stations, as I see it, at the present time.

#### ANNOUNCEMENT OF STANDING COMMITTEES OF THE ASSOCIATION

The vice-president announced the appointments to the standing committees of the association as follows:

*On Instruction in Agriculture, Home Economics and Mechanic Arts.*—For three years, G. A. Works of New York, Anna E. Richardson of Iowa, and R. A. Seaton of Kansas; for two years (to fill vacancy), Nellie Crooks of Tennessee; for one year (to fill vacancies), O. M. Leland and W. C. Coffey of Minnesota.

*On College Organization and Policy.*—For three years, C. C. Little of Maine, and Louise Stanley of Missouri; for two years, R. D. Hetzel of New Hampshire, and C. A. Lory of Colorado, *Chairman*; for one year, A. R. Mann of New York, and W. M. Riggs of South Carolina.

*On Experiment Station Organization and Policy.*—For three years, R. W. Thatcher of New York, and F. D. Farrell of Kansas; for two years, B. Youngblood of Texas, and E. W. Allen of Washington, D. C.; for one year (to fill vacancy), T. P. Cooper of Kentucky, and E. A. Burnett of Nebraska.

*On Extension Organization and Policy.*—For three years, G. I. Christie of Indiana, *Chairman*, and T. O. Walton of Texas; for two years, B. H. Crocheron of California, and T. B. Symons of Maryland; for one year, Thomas Bradlee of Vermont, and K. L. Hatch of Wisconsin.

*On Military Organization and Policy.*—For three years, E. G. Peterson of Utah, and H. A. Morgan of Tennessee; for two years, Samuel Avery of Nebraska, and W. M. Riggs of South Carolina; for one year, W. H. S. Demarest of New Jersey, and W. B. Bizzell of Texas, *Chairman*.

*On Engineering Experiment Stations.*—For three years, M. S. Ketchum of Illinois; for two years, Anson Marston of Iowa, *Chairman*; for one year, G. W. Bissell of Michigan; and *ex-officio*, the Secretary of the Section of Engineering.

*On Projects and Correlation of Research.*—For three years, F. B. Mumford of Missouri.

*On Publication of Research.*—For three years, G. R. Lyman of West Virginia.

#### REPORT OF THE EXECUTIVE COMMITTEE

The final report of the Executive Committee was presented by the chairman of that committee, R. A. Pearson of Iowa, as follows:

*Federal Legislation.*—Three pieces of legislation are pending before Congress that are of special interest to this organization. The Purnell Bill, about which Professor Christie told us this morning. You are aware that everything is being done that can be done to advance the interests of that measure. The engineering experiment station bill, for which it has seemed impracticable for several reasons to carry on an aggressive campaign at this time, but the officers of the association are not losing their interest in it, and when the opportune times comes, steps will be taken for its advancement. And last, the Fess Bill, known as the Fess amendment to the Smith-Hughes law, which will make special provision for home economics instruction under the Smith-Hughes law. Already this organization has gone on record in favor of that measure, quite a number of conferences have been held, and the incoming Executive Committee will no doubt carry on the policy that has been established with reference to this measure, and give it their strongest support.

*Smith-Lever Supplementary Fund.*—Another item of much interest to the colleges and the extension work, is what is known as the Smith-Lever supplementary item. For a number of years that has gone through Congress, carrying \$1,500,000. Last year the appropriation for the present year was passed in the same amount in one House of Congress and passed for \$1,000,000 in the other House. With great care the needs were explained to the joint committees, and finally a compromise was reached, so that we are receiving this year \$1,300,000. This year the Secretary of Agriculture recommended \$1,500,000 for use next year. The Budget committee saw fit to reduce that asking to \$1,250,000. Members of the Executive Committee conferred with the Hon. Sidney Anderson of Minnesota, one of the strong men in Congress, who has given very extensive study to the agricultural situation, and found him friendly toward this line of work, and apparently friendly towards the full amount asked. On his suggestion a conference was held with the Budget officer, General Lord. He received the committee courteously, but he was very firm indeed in his position that he could not recede from the cut which had been made, and which already had been approved, along with very many others, by President Harding. Immediately the committee requested a hearing by the appropriate committee in Congress and that was arranged. President Jardine and Directors Christie, Crocheron and Walton appeared and presented arguments. They were well received and we have some hopes that Congress will see fit to increase the appropriation above \$1,250,000 which has been submitted by the Budget officer.

*Massachusetts Suit in Supreme Court.*—Reference has been made to the case brought in the Supreme Court by the State of Massachusetts to restrain the Secretary of the Treasury from making payments under the Sheppard-Towner bill, the so-called maternity bill. Definite steps in that

matter have not been taken as yet, but action has been taken to make sure that the interests of this organization will be safeguarded.

*Biography of David Lubin.*—It will be appropriate for me to mention that a biography of David Lubin, written by his long time secretary, Madame Agresti, has been published, and those who were particularly interested were anxious that it should arrive in Washington so that you might see the book. As it has not come, I am taking the liberty of mentioning it to you. You all know of the work that David Lubin of California did in getting the International Institute of Agriculture started.

*Constitutional Amendment.*—The constitution of this organization has been amended by unanimous vote of the executive body, as indicated in the programs that have been distributed, so that in the future if the executive officer of an institution is unable to attend, he may designate a representative to take his place in the meetings of that body.

*1923 Convention.*—It has been decided to hold the meeting next year in Chicago, in the week of November 13, the dates being Tuesday to Thursday, November 13 to 15. The general arrangement of the program will be the same as at this and the New Orleans conventions. Only one criticism of this arrangement has been offered, and the officers of the association realize the weight of that criticism. It comes from the Society of Agronomy. Thus far it has seemed to be impossible to make a change in the general plan without inconveniencing a considerable number of the presidents of combined land-grant institutions, who desire to attend not only this meeting but the meetings of the National Association of State Universities.

*Section Programs.*—The officers of the different sections have been announced by Vice-President Potter, and I wish that I could say something that would impress upon them the need of making program arrangements early. Already one of the sub-sections has partly completed its program for next year, and arranged for their principal speaker. It means much to the secretary to have these arrangements made early. So the committee urges you to complete your programs before you leave Washington, if possible, or at least to make your preliminary plans and complete them as soon as you can, and then turn the copy over to the secretary of the association.

The program next year will be issued 30 days ahead of the meeting, as was done this year.

*Manuscripts.*—All the manuscripts of addresses delivered at this convention should be handed at once to the secretary. It is proposed to get out the proceedings promptly. It will be impossible to include any manuscripts that do not reach the secretary by the first week in December. I do not know how any address can be published after that, unless it is held over and included in the proceedings a year later.

*R. O. T. C.*—Many hours have been given to conferences with the War Department in reference to the R. O. T. C. work. The Secretary of War called a special conference here last week, which was attended by about 100 persons engaged in educational work—universities and public schools. The executives of six or eight of the land-grant institutions were included. Some of us have had years of contact with the War Department on these matters, and I believe we all feel that the personnel of the War Department, including particularly the officers of the army who are dealing with

these questions, were never more open minded, were never more appreciative of the work being done by the land-grant institutions. Announcement was made yesterday by Colonel Gleaves, who has succeeded Colonel Morrow as the officer directly in charge, that we need have little fear as to the reduction of personnel or support in the work this year, except the War Department, probably without much delay, will proceed to do away with the R. O. T. C. units that are not at present in a thrifty condition. They have maintained such units at some institutions, which have other strong units. We may expect the weaker ones dropped at an early date. Officers of the War Department are more clear now in their own minds concerning the attitude that the government should take with reference to military drill in high schools. They believe in it. They believe in citizenship training in the high schools. They believe in measures to develop the right physique; but they recognize that there is a difference between that kind of work and the R. O. T. C. work in the colleges, and the little overlappings or conflicts that have occurred from time to time in the past will be reduced in the future.

*The Land-Grant Colleges and the Smith-Hughes Act.*—At Springfield, Mass., emphasis was given to the teachers' training work under the Smith-Hughes Act—the great obligation that rests upon the land-grant colleges, and the great need of maintaining that work on high standards. It appears that there are more or less serious difficulties in perhaps two or three States in connection with this line of work. Efforts are being made, for example, to have this work removed from the land-grant colleges into other institutions that should not be so well fitted to give the work and to maintain such standards as should prevail. It seems appropriate to give emphasis again here to the fact that all of the land-grant institutions should give close attention to the teachers' training work under the Smith-Hughes Act, taking special care to keep their own efforts along this line on a high plane, in order that the purposes of the law may be best accomplished. If difficulties are encountered and it is thought that the newly appointed Executive Committee can assist because of their occasional meetings in Washington and their opportunities to come in contact with persons here, it is hoped that any such will be brought to their attention.

*Centralized Financial Control.*—The Executive Body has directed that a thorough study shall be made of administrative relationships between land-grant colleges and State governments, and especially with reference to the system of centralized control of finances. In one State it appears that if a representative of a college finds it necessary to go over the border, even for a mile and have his expenses paid, formal application must be made to the president of the institution, and the president must refer the matter to one of the State officers, and that State officer must refer it to the governor of the State and the governor of the State then refers it to another office for their advice, and it comes back to the governor—and I can not remember how many other offices it goes to before final action can be taken. Needless to say, such restrictions are paralyzing.

*Memorandum of Understanding.*—The Executive Body has provided for taking up with the Secretary of Agriculture the question of revising the memorandum of understanding concerning extension work, and expanding this to cover also experimental work, in so far as these lines of work are



of interest in a cooperative way, between the Federal government and the States.

*Dues.*—And, lastly, the question of institutional dues will be considered by the Executive Body this afternoon. It is hoped that it will not be necessary to increase them, but the cost of living seems to have affected this organization also, and it may be necessary within the next year to increase dues from the constituent members.

On motion, the report was received.

On motion, the general sessions adjourned.

## MINUTES OF THE SECTIONS

### SECTION OF AGRICULTURE—RESIDENT TEACHING

TUESDAY MORNING, NOVEMBER 21, 1922

The session was called to order by the chairman, Alfred Atkinson, President Montana State College.

The following paper was presented by A. R. Mann, Dean New York State College of Agriculture.

#### HOW SHALL THE COLLEGE OF AGRICULTURE DETERMINE THE AIMS AND THE ORGANIZATION OF ITS COURSES OF STUDY?

BY A. R. MANN

The discovery and application of the proper aims in higher education is probably the most insistent and the most neglected problem confronting the colleges and universities of America. Always a precondition to the organization of curricula for effective education, this fundamental question is now forced into a position of great prominence by the flood of students with more or less ill-defined purposes entering the institutions for the higher learning, and by the immense and constantly increasing investments of public and private funds in such institutions. The primary and inescapable obligation of the colleges to the investors—whether these comprise the nation, the respective commonwealths, or private benefactors—and to the young men and women placing their faith in these institutions, is a clear determination of the essential objectives of education for cultural, professional, or other vocational uses, and the application of specific measures for the sure realization of these objectives. Unless the subjects of curricula are selected, organized, and related according to well-defined purposive principles, the process of higher education must fall short, perhaps very far short, of the accomplishment which society has a right and a duty to expect and to demand.

America's great contribution to the progress of civilization is the free public school. Challenged as an impossible undertaking for any people or nation, it has justified itself so completely that it is now elemental in the philosophy and the policy of the people. So unmistakably sound and essential in a democracy, the principle has been extended to the higher ranges of education, and the State university has become a component part of the system. Even the privately endowed universities are not free

from its implications, for the public has a controlling interest in all foundations affecting the general welfare. The establishment of these great social institutions, whether by public or private grant, is warranted only on considerations of commensurate social purposes to be served. The functions of these institutions are relative to the interests of the social order. Their common justification is the service of society. To ignore the principle of utility to the social order is to deny the conception of education as a public function. The programs of the colleges must be continuous with life after graduation. The fixation of success or failure on the college or on the graduate hangs on whether the curriculum has been determined with reference to its utility after commencement. If these things be true, then the clear determination of aims with respect to social purposes, and the organization of subjects for the effective accomplishment of these aims, are a first obligation of the institutions of learning.

The organization of subjects in our colleges runs all the way from rigidly fixed curricula to more or less loosely controlled election. With the rapidly increasing number of vocations for which higher education in any given department of knowledge may make substantial preparation, the pressure for election of subjects by the individual student increases. As institutions grow large—and their prevailing tendency is to grow large, both in number and in range of subjects—the tendency toward free election grows apace, for the highest needs of students preparing to enter a diversity of fields must somehow be met. The establishment of a free-election system is a concession to teaching students in terms of their supposed free interests.

Experience with free election raises the question whether these interests for the great body of students are sufficiently developed or sufficiently wisely defined in the undergraduate mind to permit such a degree of free election as obtains in many institutions. What proportion of the undergraduates really have a clear purpose and so thorough a knowledge of the best prerequisite training for their life work as to enable them to determine wisely their educational programs, even under the guidance of advisers, who are usually specialists and have not thought through the real educational uses of subjects outside their comparatively narrow fields? To what extent does free election place on the student, rather than on the faculty, the responsibility for determining the educational policy for the individual and for the institution? Are immature students qualified to determine educational aims, and the most helpful learning for the realization of those aims; or is this the high duty of the educational experts of broad experience on the faculties? To what extent are students guided in their choice of subjects by reason of popularity of courses or of teachers, or because of a desire to escape work on certain days or afternoons, or because they happen to need a few additional hours, and certain subjects fit most conveniently into their schedules? Are the motives that guide students the ones best calculated to prepare them for their life work? Jay William Hudson, in his excellent book, "The College and New America," well says that it is the responsibility of the faculty to supplant the relative caprice of the immature student with the wisdom of expert maturity in matters that so profoundly affect the student's future and the social welfare. Yet it must be said that the uncertainty of students as to aims is frequently but little greater than the uncertainty of faculty and admin-

istrative officers themselves. As we add and clarify aims for both students and faculty, we add incentive for both.

I have a feeling that an analysis of the work taken by students where much freedom of election obtains, would reveal a pronounced tendency to sample subjects and to enroll for an undue proportion of courses which are primarily elementary or introductory in the various departments, and that the systematic taking of advanced work is neglected. What means is employed to insure that students under an elective system will obtain a sufficient number of advanced courses, with cumulative value, to warrant granting them a college degree?

I am not opposed to the elective system. My whole experience has been with such a system. I do not see how the institutions with rigidly fixed curricula can long resist the pressure to allow variation in schedules which will properly accommodate the varying requirements of large numbers of students. The evident necessity for it, especially in large institutions, forces the issue as to how its advantages are to be harmonized with wise curriculum building, based on an intelligent, carefully wrought out, educational policy.

Having thus sketched the problem very meagerly, we may now turn to the central question: How shall the objectives in the curricula of the college of agriculture be determined, and how shall the work be organized so as to fully accomplish the objectives? This is a problem in educational technology requiring careful and exacting thought and procedure. The task is not simple, easy, nor capable of quick accomplishment; nor will it ever be finally disposed of. But no effort is too great for the determination of the proper educational aims and the organization for their realization by our institutions. In what follows, I shall largely confine myself to an outline of an analysis of the problem on which we are working in the New York State College of Agriculture at Cornell University. For the outline of this study, Dr. T. H. Eaton of our department of rural education was primarily responsible, aided by his colleagues in the faculty.

In a full diagnosis of the matter, five phases of the general problem may be discussed: (1) The determination of the major aims, or objectives, of the college, as a prerequisite to curriculum making. (2) A study of the situations to be met within the several divisions of the general field, or in the successful discharge of the duties which each of the major aims imposes on the individual. (3) The determination of the organization of curricula which will best prepare students to meet the situations or discharge the duties in each of the divisions of the general field. (4) The determination of the content and the organization of the several subject courses of instruction offered by the departments. (5) The determination of the methods of teaching appropriate to the respective courses.

A faculty must organize itself for such a study. This will doubtless involve the designation of a series of committees, including, first, a central, or administrative, committee, to determine the scope of the study, to direct its conduct, and to finally review, harmonize, and report the findings of sub-committees charged with the investigation of the divisions of the general problem. A wise faculty will not be limited to its own membership or be bound by any considerations of personal prestige in the selection of committee members. Success will be wholly dependent on the qualifications of

the individuals for the parts assigned them, and on their readiness to do the work.

#### I. THE DETERMINATION OF MAJOR AIMS

The determination of the major aims of the college of agriculture requires an examination of the field of both economic and social activities for which such a publicly maintained institution of higher learning may appropriately undertake to prepare young men and women. This resolves itself into:

A. A study of the indices of public policy in respect to the college. What are its legally defined obligations and implications as set forth in: (1) State legislation and regulation, and (2) Federal legislation and regulation? All of our colleges of agriculture have their aims and purposes, in part at least, defined by State or Federal statutes, or both.

B. A study of the field of the college as limited by the development of departments of knowledge assigned to other colleges or departments in the university, both in the interest of sound educational organization for a given institution, and to avoid harmful gaps or needless or inefficient duplication.

C. A study of the nature and the range of life pursuits now followed by graduates of the college and by those who matriculated, but for some reason did not graduate. The motives which actuated the later persons may have an important bearing on the matter. This study should include: (1) The number in the respective pursuits, as, for example, in teaching, farming, extension service, cooperative organizations, and the like; (2) the effective demand for college-trained men in these pursuits; and (3) the opportunities both for service and for reward in such pursuits.

D. A study of new activities and openings toward prospective occupation falling within the field of public policy for the college, or correlated with those in which the graduates or non-graduates are now engaged, as, for example, in the direction of city markets, rural finance, or hotel management for home economics students.

When these studies have been completed, the facts will be available to make possible the division of the field of the college into groups or segments made up of pursuits which overlap largely in their likenesses or which may be said to belong to the same genus, each segment or genus being grouped about a specific type pursuit which is dominant in its demands for service and which opens opportunities to relatively large numbers of persons. This means to do for the college as a whole what individual departments sometimes attempt to do in very much narrower lines within the field of their specialties.

A committee undertaking this broad, fundamental study will be strengthened if it can have in its membership persons versed in the theory of social evolution and in the implications of public service through education, as well as persons widely acquainted with the different sorts of agricultural occupations.

#### II. DETERMINATION OF THE SITUATIONS TO BE MET WITHIN THE SEVERAL DIVISIONS OF THE GENERAL FIELD

Having located the major aims and divided the field of the college into its major segments or generic groups, the next question to be determined

is concerned with the situations that must be met by persons entering any of these several fields or groups. This resolves itself into:

A. An analysis of the duties, obligations, enterprises, jobs, and the like, or what may be called normal, or usual, type situations, of the several professions, businesses, or other pursuits included in each of the segmental divisions of the general field. This promises to be an arduous task; but how can education be properly organized to prepare persons for specific fields of social endeavor without a knowledge of what are the practical situations which successful operation in those fields must encompass? This was early acknowledged in the more elementary fields of vocational education. It has its full counterpart in the higher technical and professional occupations.

B. The discovery of the normal prerequisites, in individual physical and mental capacity and in acquirement through training or experience, with reference to both duration and kind of training and experience, to successful entrance upon such pursuits. This should include the normal prerequisites in terms of the initial capacities of the individual, in terms of abilities normally acquired in schooling and experience prior to entrance to college, as, for example, farm and home experience, and in terms of occupational and civil abilities not developed by agencies other than the college of agriculture, that is, those not developed by other colleges in the university, by outside employment, extra-curricular activities, and the like; these latter two considerations being necessary to indicate where the college instruction should begin and how wide a range it may appropriately seek to cover, to prepare its students to meet the inevitable situations in the respective fields.

When the situations which will confront the graduate entering the respective fields have been thus discovered, and the prerequisite capacity and acquirement determined, the next step is to group or segregate the situations and the corresponding abilities which are: (1) Common to the whole field of major aims of the college, and so of basic importance for all students, regardless of their intended fields of specialization—that is, those common to the occupations of agriculture, home economics, scientific investigation, agricultural teaching, and the like; (2) common to several of the segmental divisions of the field, and so a factor in determining the training for those groups, which, however, may not be essential or permissible for other groups—for example, those common to farm management occupations, teaching occupations, and extension service; (3) common to all the specific pursuits within a single segment or generic group of pursuits, such as college teaching, high school teaching of agriculture, teaching of home-making; (4) highly specialized or restricted to a single or a few pursuits and, therefore, of importance only to the students specializing in those pursuits, as, for example, in beekeeping, buttermaking, fruit growing, market gardening, supervising agricultural schools.

The committee assigned to make this study may well have in its membership a person trained in educational psychology, and persons acquainted with a broad portion of the general field of the college, as well as those competent in the particular segmental divisions.

### III. DETERMINATION OF THE ORGANIZATION OF CURRICULA APPROPRIATE TO THE RESPECTIVE SEGMENTAL GROUPS

Having discovered the situations to be met and the prerequisite abilities demanded, and having classified them according to their importance for all the students or for successively smaller groups according to their fields of interest, the task narrows down to the determination of the curricula which should be organized for these several classes. This phase of the general problem may be considered as having three aspects:

A. The organization of curricula appropriate to the needs of the several segments of the field of major aims, or the generic groups of pursuits, as previously determined, such as teaching, research, school administration, farm management, domestic economy. It is only when the facts are available as to the needs in the respective divisions of the field that a faculty is in a position to build a curriculum intelligently for that field.

B. The organization of curricula appropriate to the needs of students of the type and capacity for the respective segments, revealed by the study. It goes without saying that the organization of these curricula must take into consideration what is required and offered for entrance, and whether the preparation will require a short winter course, a four-year course, postgraduate study, or other special work; it also considers the health and physique required, the farm experience, and the like.

C. The organization of curricula appropriate to the actual or the potential resources of the particular institution. A curriculum may be enriched or it may be undesirably limited by the actual or potential resources of the college or the university of which it is a part. A given institution may be favorable for the training of farm managers, but not for the preparation of teachers of agriculture; or for the training of agricultural teachers, but not industrial teachers.

Before a curriculum is ready to be offered to students, it should be judged by these three criteria: (1) Its appropriateness to the needs of the field, based on exact knowledge of those needs, the situations to be met, and the training and ability prerequisite for successfully meeting them; (2) its appropriateness to the needs of the students, based on a clear knowledge of the type and the capacity required for success in the respective groups of life activities; (3) and whether it properly utilizes the resources of the institution.

### IV. DETERMINATION OF THE CONTENT AND THE ORGANIZATION OF THE SUBJECT COURSES OF INSTRUCTION

The task is only partly done when a faculty has succeeded, through prolonged and thorough study, in organizing curricula requisite for the fields and the students it serves. It is equally important, for the neglect has been almost equally as great, to formulate and organize the content of the departmental and individual subject courses of instruction. To do this successfully, all the resources in knowledge revealed thus far by the study should be brought to bear on the individual subject courses. This will require the combined judgment of the persons who are most competent in the skill and technology of the subject-matter department, and persons versed in the field of educational technology. In bringing the individual course units to their most serviceable educational use, thorough-

going educational surveys of the departments of instruction have a place. The progressive teacher will be the most ready to invite this aid on his courses. The opposition to such interference with one's own particular field is likely to come chiefly from those who need it most but who are complacent with reference to their work.

#### V. THE DETERMINATION OF THE METHODS OF TEACHING APPROPRIATE TO THE RESPECTIVE SUBJECT COURSES

Successful instruction requires that there shall be combined with the proper content and the proper organization of subject matter, a method of teaching best suited to the subject and to the abilities of the students in the classes. College teaching will be immeasurably improved when the technical and the educational experts work together to formulate the teaching procedure in the various courses. Happily there are many indications of progress in this phase of the general question. Along with the formulation of teaching methods, and in order to test both the methods and the content of the courses, there is very urgent need that reliable and readily applicable means shall be devised for the measurement of progress and the achievement of students. Education everywhere needs a sure method of determining the real educational progress of the individual student. Has he attained during the course or during his two, three, or four years the technical and the intellectual growth which should be reasonably expected, and is it in the direction of his needs? We can not determine whether the development has been what it should be unless we know the direction in which it should be made. We do not know with accuracy just what should be expected or how to measure what has been achieved, but it is clear that normal standards can be derived through study over a period of years.

#### CONCLUSION

This outline of a means for determining the real aims of the curricula of the agricultural college, and for the organization and relating of courses in the several curricula for the most successful realization of the aims, is doubtless incomplete and leaves much to be desired. Its philosophy merits close examination. The exact plan of procedure must be regarded as tentative and experimental. We realize that it is difficult of application and that it involves some exhaustive analyses of conditions and situations on which we now have but meager information. It contains proposals which are new to our colleges and on which we are without experience as to the best way to proceed. How successfully our institution, or any other, may carry through such a thoroughgoing and comprehensive analysis of the whole field remains to be determined. I think, however, that this outline provides a satisfactory way of beginning. When several institutions have carried through comprehensive studies, according to this or some other plan, there will be a cumulative body of knowledge and experience of high value. We have here a field of educational investigation which merits the best thought and devotion of the ablest in our faculties. The necessity for careful and intelligent planning, based on a full knowledge of all the factors, is now regarded as merely good form in all fields of human endeavor. It is nowhere of more outstanding importance than in the field of education. The other day, in his able inaugural address as president of the University of Buffalo, Dr. S. P. Capen, discussing at length the need

for educational research of the job analysis sort, said, "A series of careful job analyses of the various professions would be highly suggestive to those charged with professional education."

We are recognizing the need for vocational counsel and guidance in the technical and professional fields of agriculture, but we are but poorly equipped to meet the challenge. We have started with and clung to the field of knowledge and a conception of formal discipline rather than with the life pursuits for which, as public institutions for technical education, we are created to prepare men. The prevailing tendency is undoubtedly to teach as though the end were the subject or a conceived discipline instead of the social purpose of the education. With rapidly growing specialization, the isolation of subjects from one another and from any clearly defined social objective is accentuated. Unless, through the action of the faculty as a whole, controlling aims are set up, the individual teacher, being a specialist with a paramount interest in his subject, will ignore the unified life function of the student. The correlation of the work of the specialists so as to obtain unity in the curriculum, cumulative worth, and controlled direction toward intelligently determined objectives, is the *sine qua non* of successful college instruction in a technical or any other field. Most faculties have never attempted to correlate the functions of their various specialists in view of specific educational purposes. In order to give a semblance of controlled educational policy, dependence has been placed on group systems characterized by similiarity of courses. On the contrary, the group systems should be based on similarity of functions in a specific aim for education. All of which means that the time has come when a policy of little more than educational *laissez faire* should give way to a policy of intelligently conceived, organized, and directed educational procedure.

In offering this approach to the discovery of the real aims of our colleges of agriculture and the organization of courses for their realization, I would not be understood as advocating that the function of the colleges is merely to turn out men with certain skills. This would be too narrow a view, unworthy of collegiate education. It is the high duty of our colleges to do more than this. A properly organized curriculum will give the student a clear understanding of the principles and laws, the forces and the elements, which underlie the practices and the skills; and it will recognize his wide responsibilities as a citizen. The principle of utility must play an important part; but to restrict the college curriculum merely to utilitarian courses would be to debase the purposes of collegiate instruction. The acquirement of a culture which is broad and versatile is equally a function of our colleges, but one which must be harmonized with our specific tasks as technical and professional institutions, and neither ignored, on the one hand, nor allowed to obscure our obligations to effective technical education, on the other.

#### DISCUSSION OF DEAN MANN'S PAPER

W. M. JARDINE, President Kansas State Agricultural College. I am sure we, who have just listened to Dean Mann's paper, are of one opinion, and that is, that Dean Mann has given a great deal of thought to this question and has prepared a very comprehensive paper dealing with it. Not having had an opportunity to read Dean Mann's paper, I, of course,



am not in a position to discuss it intelligently. Anything that I shall have to say will be based upon my observations and experience in connection with the making of agricultural courses.

The aim or primary purpose to be accomplished in a four-year curriculum in agriculture, as I understand it, is to aid young men to prepare themselves for service. Society supports State institutions, not for the good of the individual but for the good of society as a whole. Those making a curriculum should ever keep this responsibility before them. They should study the character of the jobs that these young apprentices are going to be called upon to tackle and solve on going out of college. The character of the curriculum should be such as to prepare students in the best possible way for the work that society has a right to expect that they be able to do. This service may be exercised by bona fide farmers, county agricultural agents, extension workers, agricultural teachers, scientists, or others engaged in agricultural enterprises. To be a constructive leader in any of these lines a man needs to possess a sound character; broad, sane ideals; strong, clean enthusiasm; quick courage to face facts and difficulties; a controlled body, a trained mind, and some degree of skill in one or more definite lines. An agricultural curriculum should, as far as practicable, aid a young man to develop these qualities to the fullest extent possible.

The welfare of American agriculture is influenced by a large number of factors. The type of farming is one; distribution and utilization of agricultural commodities, is another. These two are connected inseparably with many other factors, including such things as finance, standardization and grading of farm products, transportation, taxation, scientific achievement, and rural education.

The welfare of our agriculture is associated inseparably with the conditions of American country life. The agriculture and the country life react continually upon each other, and the two must have concurrent attention if either is to be substantially benefitted.

Consideration of these facts suggests that the subject matter of the agricultural curriculum should include a strong foundation of basic work in the physical, biological, economic, and social sciences. Successful agriculture involves the application of many of the facts and principles of these sciences to the farmer's problems. One of our chief aims in the teaching of the agricultural subjects should be to implant this idea in the student's mind and to help the student to learn how the facts and principles of the basic sciences may be applied beneficially in the enterprises of agriculture and the institutions of country life. In following this aim much can be done to help the student to develop skill.

In making a curriculum we should keep in mind the wide variation of native ability, or capacity to learn and carry a load, of those who come to us each year as Freshmen. We must not build the curriculum for the average student alone. The public is looking to the colleges of the land and demanding that the super-normal or brilliant student be given an opportunity to develop his ability for leadership. An ideal curriculum will be adapted to the groups according to capacity. It will give each group an opportunity to develop their respective abilities to the completest possible extent. Each individual will be encouraged to do his best. The slow student will not become discouraged nor the brilliant student become lazy,

for each will have a load suited to his ability, and thus tend to develop better habits of work and study.

We have no means of knowing what specific occupation will be followed by any one of our agricultural students subsequent to his graduation. Our institution has compiled a list of some 150 agricultural occupations for any of which a student in the agricultural curriculum receives some preparation. We find that about 50 percent of the graduates of the Kansas State Agricultural College are engaged in farming, 36 percent in agricultural occupations other than farming, and 14 percent in non-agricultural occupations.

Because of the great number and variety of occupations which are open to the agricultural graduate and of the uncertainty as to which of these he will follow, it would be undesirable for the college to attempt to shape precisely the course of study followed by any student so that he would be lead inevitably into a particular occupation. Such an attempt would be both futile and wrong. In the agricultural curriculum a large part of the training must be sufficiently broad in character to promote sound American citizenship and to be useful in any agricultural occupation, whether that occupation be one of the many branches of farming or some other agricultural occupation, the conduct of which promotes agricultural welfare. Beyond this point we are limited necessarily to offering to each student his choice of a somewhat specialized group of subjects, the primary object of which is to afford preparation for service in a somewhat specialized group of agricultural occupations.

We must keep in mind that presentation is quite as important as subject matter. A course in botany can be taught in such a way as to leave the student with little or no appreciation of the relations of the facts of botany to the problems of crop production or the beautification of a country home. Likewise, a course in grain crops can be taught on the old "farmers' institute" basis without definitely, clearly, and repeatedly emphasizing the fact that a large part of grain production is a specialized application of the facts of botany. Anything which is practicable to do to vivify subject matter—to show the intimate relationships between science and good practice and to give the student inspiration and sane enthusiasm—should, of course, be done.

One of the strongest influences contributing to the proper development of young men and women while in college, is the influence of the teacher. We need real men and women—possessing not only high educational qualifications but a background of experience, broad minds, strong personalities, and big souls. Even a faulty curriculum may succeed with such leaders.

In summary, it may be said that the principal object of the four-year agricultural curriculum is the development of leadership rather than mere artisans; that the college will render the best service if it helps men prepare themselves to be "officers" rather than "privates," remembering, however, that an officer needs to know a great deal about the duties of a private and to be able, if necessary, to perform them; and that the best reason a student has for following the agricultural curriculum is that it enables him to familiarize himself with a large body of scientific facts and principles upon which successful farming and satisfactory country life must be based and with methods of applying these facts and principles. And finally,

it is always to be remembered and always to be emphasized that in any college curriculum the students should be required to learn to think.

K. L. BUTTERFIELD of Massachusetts. I agree with the philosophy that underlies Dean Mann's paper and with the methods. I have two observations to make. The first is negative. If we take this job analysis as an indication of the general direction, it seems to me that we are on safe ground; we can then know which way we are going, but we don't know all the situations; we can't possibly analyze accurately all of these jobs. We don't know what the boys are going to do and we don't know the boys; and even if we do know the boys, we have to make adjustments to individual capacities and to individual jobs that are coming later.

The other observation is positive. I have felt that neither the so-called liberal colleges nor the vocational schools have given sufficient attention to the social and individual implications of work, of occupation, of profession. I think that this job analysis, if it is to stimulate motivation, must go much farther than we have gone. It is a matter of vocational education, but it is far more than that. Its social implication is more than doing a job well; it reaches the roots of social service and of personal culture through one's work.

C. B. WALDRON of North Dakota, pointed out the need of more intensive and effective instruction.

R. L. WATTS of Pennsylvania. We had the feeling at the Pennsylvania State College that it would be possible to improve the teaching. We invited Dr. Kilpatrick to come and teach our teachers. Ninety-five percent of the school faculty entered classes to learn the best ways to teach the subjects which were taught in the school of agriculture. We were highly pleased with Dr. Kilpatrick's work. There is no doubt in my mind that that is a good thing to do. A great deal of good can be accomplished if you have a master teacher. The Pennsylvania State College has been improved by the two courses.

ALFRED ATKINSON of Montana. In the Montana State College we patterned a course of 12 lessons for the faculty, and this course was conducted by our professor of psychology. Two years ago we set up a committee on agricultural policy which is bringing before the faculty at intervals through sub-committees detailed descriptions of methods they have in mind.

R. L. Watts, Dean School of Agriculture, Pennsylvania State College, presented the following paper:

#### AIMS, PURPOSES, AND CREDIT VALUE OF LABORATORY WORK

By R. L. WATTS

A study of the curricula of our land-grant institutions reveals the fact that great emphasis is placed upon laboratory work. Teachers of botany, chemistry, geology, physics, genetics, bacteriology, and other sciences, regard laboratory work as indispensable in a thorough course of instruction. Likewise, teachers of applied subjects such as pomology, vegetable gardening, agronomy, dairying, animal husbandry, and poultry husbandry almost invariably devote a definite amount of time to laboratory

work. Considering the large amount of attention which every one of our agricultural colleges gives to laboratory work, it is exceedingly important that we understand and appreciate the aims and purposes, as well as the advantages of this method of instruction.

*A study period.* A successful teacher has aptly said, "Every laboratory period should be a study period." If a simple exercise, requiring practically no thought, is assigned the student the benefit will be very slight indeed. On the other hand, if the student is assigned a real problem, requiring concentration, accurate observation, and logical reasoning, in addition, perhaps, to careful manipulation, as in chemistry, the benefits from both an educational and informative point of view will be immeasurable. It may be difficult in some subjects to make the laboratory hours study periods, but this should always be one of the chief aims. Let us suppose that the student is engaged in making root grafts. It is likely that he has learned the simple principles of grafting in advance of the laboratory period and, therefore, how can it be a study period? Is this not an opportune time for the boys to swap yarns and to discuss athletics, college dances, etc.? No, not if the instructor grasps the opportunity to enlighten them still further about grafting. He has made a big mistake if he told them in the classroom all that he knew about the subject. If the students are to become successful professional pomologists, they should acquire more than mere manipulative skill during the laboratory periods devoted to grafting. The most instructive and interesting studies may be introduced into all laboratory work.

*Should develop an inquiring mind.* Laboratory work should aid in the development of inquiring minds. Every alumnus of our agricultural colleges should be an investigator. It is apparent that a relatively small percentage of them will become research specialists in the employ of the national government and the agricultural experiment stations, but every graduate should have the investigational spirit and be eager to increase his knowledge of matters which will enrich his own life and make him a more useful citizen. No feature of our college program will contribute so largely to this purpose as properly conducted laboratory work. A certain amount of research or experimentation may be introduced into practically all laboratory courses. New problems, or old ones, in more serious forms, are constantly arising in every branch of agriculture. Why not utilize some of these problems for study, even among undergraduate students? Their investigations may lead to conclusions which can not be accepted, but this probability does not affect the soundness of the proposal. The aim is to develop an inquiring mind and it can and will be done by proper methods of laboratory procedure. For example, black leg of cabbage, though an old disease, has suddenly become a very serious menace, and not very much is known in regard to the disease or means of controlling it. Why not direct a group of upperclass men, who are studying plant pathology, in the investigation of this pest and methods of combating it? There is no limit to the number of problems in nearly all our laboratory courses which would be suitable for student investigation. I am not unaware of the fact that a considerable number of teachers in the land-grant colleges have adopted the policy of assigning problems, but the practice is not generally followed by perhaps the majority of our instructors. If more of our undergraduates learned the fascinations, the satisfaction, and the real

compensations of investigational work, there would not be such a dearth of well trained scientists who desire to choose research as a life career.

*A means of teaching principles.* The laboratory method is the best means of teaching principles. In the practical courses in horticulture, poultry husbandry, animal husbandry, etc., the accusation is sometimes made that the laboratory work is largely vocational in character and not of college grade. No doubt, the claim is often true and it is no credit to the instructors involved. All teaching in our land-grant institutions should be and may be of college grade. If we will place proper emphasis on the teaching of principles in the laboratory work, as well as by lecture and recitation, there will be very few complaints of this kind. To illustrate the point, every student of vegetable gardening should be taught how to store celery successfully, and the operations of harvesting and storing are important laboratory exercises. But more important than the actual procedure in these operations are the questions of: What causes celery to blanch? What should be the condition of the plants when stored, and why? What happens when there is excessive moisture in the pits or house? When there is excessive heat? It is better for the student to have the plants answer these questions than for the instructor to answer them. For effective teaching, some plants should be stored under adverse conditions of heat, cold, moisture, and ventilation. The wise teacher will lead the students in their explorations for knowledge and in their processes of reasoning, rather than attempt to tell them everything that is known about the subject under consideration. He will also place greater emphasis upon principles than on practice.

*The power of reasoning is developed.* Properly conducted laboratory work develops the power of reasoning. Relationships are studied and conclusions formed. Recently I observed a large class of students judging half a dozen beef cattle. All of the animals will be shown at the International Livestock Exposition. They were fine specimens and quite uniform in type. After an hour of careful study, each member of the class placed the animals according to his idea of merits. Some of the boys placed the steers correctly, but most of them did not. They failed to see in each animal all that they looked at, and especially did their power of reasoning fail them. They were inexperienced stock judges, and every one underestimated the weights of the best animals. They didn't fully understand the relation of type to weight as well as to values on the butcher's block. Every laboratory exercise should be utilized to the utmost in developing the student's power of reasoning.

*Visual instruction.* The principal of visual instruction is just as important in college teaching as in the lowest grades of our public schools. Then, too, the field of human knowledge is so vast and there is so much we would like to include in the college curriculum, that we ought to utilize visual instruction to a much greater extent, as a means of saving time. Most laboratory work is a type of visual instruction. Only a moment is required for the student to gain a lasting impression, when he observes through the microscope objects which are invisible to the naked eye, and which would consume much of the instructor's time were he to describe them in detail. The greatest diversity of illustrative material should be used in laboratory work, and there is no conflict between this suggestion and the one previously made, namely, that laboratory work should strive

to develop the student's reasoning powers. In many instances we do very little reasoning until definite information is imparted to the mind through the eye. A few days ago I saw, for only a few minutes, a chart showing in a most graphic manner the vitamin content of the leading vegetables in contrast with some other food products. I have been reasoning ever since about the place certain vegetables should have in our daily diet—all because of my mental picture of that chart.

*Develops manipulative skill.* In many subjects, properly directed laboratory work develops manipulative skill. The student learns how to graft, to sow seeds, to transplant, to prune, to bud, to operate incubators and brooders, to care for livestock, to grow crops, to use the microscope and other scientific apparatus and to do a great many things that might be regarded as handicraft. Now, should activities of a vocational nature be permitted to enter into a college or university course in agriculture? We would be fortunate, indeed, if all our agricultural students could receive such instruction, adequate in scope and character, before entering their collegiate courses. However, it is unlikely that such an ideal condition will ever prevail in all the States and the graduation of agricultural students without such training is inconceivable. Our graduates would be incapable of serving as successful producers, county agents, teachers of vocational agriculture, farm managers, etc., and then the State and Federal governments would refuse to provide funds for the land-grant institutions. We might just as well talk about teaching courses in civil engineering without giving the students any practice in the use of the transit. Most college courses in other fields are vocational in their aims, though this is not always admitted; and because a course is vocational in character is no reason why it should not be placed on a high collegiate basis.

*Laboratory work stimulates interest.* One of the chief purposes of laboratory work should be to stimulate interest, and to create enthusiasm in the minds of the students. It enables them to study the things themselves instead of about them. It puts zeal and zest into a course which otherwise may be as dry as punk to the average student. Inspiration is just as important as education. College men as a class are fairly well educated, but in many instances they have so little enthusiasm and real interest in some definite life work that there is little hope of them succeeding. Agricultural students should see and study the best in the way of fruits, vegetables, flowers, farm crops, livestock, and farm machinery, and all laboratory work should be made as interesting as possible.

*As an aid to English.* Laboratory work should be accompanied by a most careful student record of observations and achievements. The use of good, clear English should be demanded in every report. Too much has been expected of the few courses in English taught during the freshmen and sophomore years. Such courses are of great value, but they do not exempt instructors from giving further attention to this matter in connection with laboratory reports.

*Credit values.* A study of twenty-five catalogues of land-grant colleges reveals the fact that only three of this number have laboratory periods three hours in length; and all the others schedule two-hour periods. In every instance, whether the period is two or three hours in length, one credit is allowed and is considered the equivalent of a one-hour recitation or lecture period.

Undoubtedly many laboratory periods are not worth a full credit in value. An enormous amount of time may be wasted by not providing adequate and satisfactory laboratory material. This may easily be the case in stock judging, fruit judging, greenhouse management, and in many other kinds of laboratory work.

#### DISCUSSION OF DEAN WATTS' PAPER

A. G. McCall of Maryland. My viewpoint is somewhat limited by the fact that my teaching experience has been along somewhat different lines from those discussed in the paper. I have had experience in agronomy rather than horticulture. I want, however, to voice my hearty approval of the first point, namely, that the laboratory period should be a study period, a period of productive thought. The effect should be carried on through the week. The student should be able to pass a recitation or quiz based in part on the work of the laboratory period.

The laboratory period should be used to develop the spirit of investigation, the spirit of inquiry, that will stand the student in good stead in after life.

Many of us are perhaps much more easily impressed through the eye than through the ear, and if the laboratory work can be made to teach through the eye as well as through the ear, we will accomplish more than merely by lecture or research. Laboratory work should be very closely correlated with the lecture and research work. I believe that the agronomist, in particular, has been guilty of misuse of the laboratory period. There is now in the American Society of Agronomy a committee working on the subject of correlation of laboratory and lecture work in soils and crops. I believe that the work of this committee will result in improvement in our laboratory practice.

ALFRED VIVIAN of Ohio. We could have more of the laboratory work that Dean Watts outlines. I would say the more of it we can have the better. One great fault is the lack of the correlation that Professor McCall speaks about. Students can not see the relation of the laboratory work to the classroom. We assume that certain courses ought to be divided—3 recitations and 2 laboratories or 4 recitations and 1 laboratory. We have not paid enough attention to the matter of what time we can use in the laboratory. In a large institution with a schedule committee the schedule committee may say we can not give you 3 recitations and 2 laboratories, but we can give you 4 recitations and 1 laboratory, I wouldn't have any separation of laboratory and lecture. I would say to an instructor, "You can have so many hours of the student's time." We have been successful in getting one department to try that plan. We give that department 9 hours a week of a student's time. It can take as much time for class and as much time for laboratory as it wishes, and what is happening is that the laboratory varies in amount. We need to study pretty carefully the laboratory work that is being given, whether there is a correlation between the laboratory and classroom work and whether the laboratory is really stimulating thought and stimulating a research spirit, or whether the laboratory period is spent in loafing.

C. B. WALDRON of North Dakota. There is a lack of preparation of good outlines, defining exactly what the students can do. If the student has well prepared and specific outlines, day by day, which connect up with

his lecture program in laboratory work, he knows what to expect, and his time is saved for him. We have found that the 3-hour laboratory period is a very great advantage in many subjects and we are getting to that more and more. In many of our courses there is a 3-hour period that can be used as the instructor wishes. Carefully thought out outlines will make laboratory work really worth while.

J. H. SKINNER of Indiana. I approve of laboratory work, but my observations at our institution are that there is a tendency to outline too much. If I should make a suggestion it would be to ask the questions and leave out the outline, leaving something for the student to do. I think much time is wasted in laboratory work. Any dean who has to deal with a number of departments and who has to take care of mimeographed sheets is impressed with the fact that the professor directs the work for the student and leaves nothing for the student to do. If you are teaching a vocational school, that is very necessary. What we need is to inspire thought in the students.

R. L. WATTS. In all laboratory work responsibility should be emphasized as much as possible. In the teaching of vegetable forcing, for example, I think it is all wrong to give the student a definite outline as to just how to proceed in his work. Let him make his own outline for the laboratory work. Give the student a plat of ground and tell him he is expected to make a showing there with vegetables. You will grant he will begin to think and make plans as to what he will do with the plat of ground. Two boys out of three at our institution are city boys and it makes it exceedingly important to get them in touch with the soil.

H. L. KENT of New Mexico. The illustrations which Dean Watts gave seem to me to apply in a course having as its aim the acquiring of a knowledge of certain scientific phenomena. The outline is to help merely to throw light on the facts presented in the classroom.

Another type of laboratory exercise is that used largely for the purpose of acquiring skill. It requires little or no outside work.

E. W. LEHMANN. In courses like those in farm mechanics, where field work is demanded, the plan of having three 3-hour laboratory periods that the instructor may do with as he sees fit is very satisfactory.

#### ELECTION OF OFFICERS

The following officers were elected: Chairman, J. H. Skinner, Dean School of Agriculture, Purdue University, Indiana; secretary, A. R. Mann, Dean New York State College of Agriculture.

#### TUESDAY AFTERNOON, NOVEMBER 21, 1922

This was a joint session of the three sub-divisions of the Section of Agriculture, presided over by the chairman of that section, B. W. Kilgore, Director of the North Carolina Experiment Station, and dealing exclusively with matters pertaining to resident teaching.

The session was devoted to the discussion of world agriculture, the following paper on the subject being presented by E. G. Montgomery, United States Department of Commerce:



## SOME ASPECTS OF THE WORLD AGRICULTURAL SITUATION AND EUROPEAN CONSUMPTION

BY E. G. MONTGOMERY

A general picture of the principal changes that have taken place in production and consumption of agricultural products can be very quickly presented. In the first place, if we consider Europe we find that in the prewar period European countries had reached a very high state of production, and Europe, as a whole, was about 95 percent self-supporting in food-stuffs and about 30 percent self-supporting in clothing materials, such as cotton, wool, hides, skins and fibers. However, these clothing materials were largely supplied by European colonial possessions.

The war period brought around certain profound changes. In general there was a drop in production of foodstuffs throughout Europe which amounted to 30 or 40 percent, and a corresponding drop in consumption. This resulted in a considerable change in food habits. There was a decreased consumption of meat, sugar, high-grade wheat flour, alcoholic beverages, and less waste; but an increased consumption of low-grade flour and cereal foods, and of potatoes and other vegetables. There was also a reduction in the caloric content of daily consumption when we consider consumption of both food and drink, as a large part of the European population consumed in excess before the war, and was in a sense over-nourished; while at the end of the war a large proportion of the population were under-nourished. While conditions are slowly improving, this condition still exists in parts of Europe.

Since the war Europe has made only a partial recovery in production, roughly, about 15 percent when all commodities are considered. We can state in a general way that while western and central Europe were on a 70 percent prewar consumption basis, they are now on about an 85 percent consumption basis.

The recovery varies with different commodities. The consumption of wheat and rye is almost back to prewar normal, amounting to, viz., 92 percent. The consumption of coarse grain is still about 74 percent; potatoes 70 percent; and sugar about normal and cotton 61 percent. Also the caloric consumption of food in alcoholic beverages is much lower than in prewar years.

While this decrease in production and consumption was going on in Europe, there was a corresponding increase in production outside of Europe. However, this increase took place principally in North America, as there was no great change either in South America or Australasia, the two other great surplus producing regions. During this period, also, Russia, which before the war furnished western and central Europe with almost half of their grain imports, was completely eliminated as a surplus country. While Europe is actually taking less grain than she did in prewar years, the whole Russian trade has been shifted largely to North America and is now being supplied by the United States and Canada. If it had not been for the elimination of Russia as a surplus country, it would have been practically impossible to have marketed more than half of the North American surplus in the four years since the close of the war. It is interesting to note that neither South America nor Australia made any great increase in production; in part due to the fact that they were limited on

shipping during the latter part of the war and consequently prices of agricultural products did not have the great rise that they did in the United States and Canada, while the latter countries, due to their nearness to Europe, were in a position to supply, and did supply, most of the products.

#### THE EUROPEAN MARKET

In the world agricultural situation the matter that interests us most is the relation between supply and demand and the corresponding effect on the world price level.

Western Europe takes about 90 percent of the surplus agricultural products of the world, of which Great Britain takes approximately one-fifth. Therefore, the European crop, consumption, and buying power, are perhaps the principal factors in determining world price levels.

Four countries produce about 90 percent of the world surplus of agricultural products, namely, Canada, United States, Argentine and Australia, of which the share of the United States is approximately one-half.

The study of world supply and demand, therefore, becomes a very simple matter of studying the effective demand of western Europe on the one hand, and the available surplus in the four principal exporting countries on the other. The purchase by Europe of supplies from all sources establishes the international price level.

This can be illustrated by the daily movement of wheat. On any day 50,000,000 to 60,000,000 bushels of wheat are afloat, mostly for north European ports. If the wheat at any port on either side of the Atlantic is a few cents out of line this will at once cause a diversion of floating cargoes, either toward that port, if the price is high, or away from the port, if the price is low. The effect of this is to maintain a "sea level" price at the principal ports on both sides of the Atlantic, with, of course, a differential amounting to cost of transportation and handling between the exporting and importing countries. This international price level and the factors affecting its rise or fall are of great importance to producers in all surplus countries, and has a direct effect on the economic condition of American farmers.

The four great surplus products of the United States farms are cotton, wheat, corn, and hogs. We export 50 to 60 percent of our cotton; 25 percent of our wheat; and about 60 percent of the lard and 15 percent of other pork products manufactured in slaughter houses. These may be considered key products. The price of wheat is generally believed to more or less affect the relative price level of other cereals. The price of pork products without doubt directly affects the price of corn, while the price of cotton controls the whole economic situation in the Cotton Belt and indirectly exercises a wide influence in other sections. With these three great key products controlled by international price levels, we see how intimately the economic problem of American agriculture is tied up with foreign trade and the economic problems of the whole world. Even those products that enter very little into international trade are, nevertheless, controlled by world price levels more than is generally known. For example, butter is largely consumed in the countries where it is produced and enters into international trade only in a small way. Several times during the past three years when butter prices in the United States reached a point some-

what above the world price level, a few small cargoes of Danish butter landing on the Atlantic coast, or New Zealand butter on the Pacific coast, brought back our own price sharply into alignment with international prices.

The above remarks are made to show how important it is for American agriculture to take account of the economic conditions of Europe, the principal buyers of surplus agricultural products, and also the general agricultural situation in the great surplus producing countries which compete with us in this market.

#### THE EUROPEAN SITUATION

The European market for agricultural products naturally commands our first attention. For the present in referring to Europe, Russia will be left out, as it is neither buying nor selling agricultural products in large quantities and is not likely to be a factor in the near future.

Before the war western and central Europe were about 85 percent self-supporting in foodstuffs, and 30 percent in clothing materials, such as wool, hides, and cotton. The individual countries, of course, varied a great deal; England being about 40 percent self-supporting in foodstuffs, Italy about 80 percent, France about 90 percent, while Austria-Hungary was just about 100 percent, when the principal products are taken account of, namely, grain, sugar, potatoes and meat products.

During the war European production fell to about 70 percent in foodstuffs based on prewar average, while imports also were about 70 percent of the prewar average. Consumption decreased correspondingly, so that at the end of the war Europe was consuming approximately 70 percent as much foodstuffs, wool and cotton as in 1913.

It may naturally be questioned how Europe got along on such reduced supplies. In part, at least, this was accomplished by gradually consuming a part of the livestock, and utilizing the livestock food as human food. For example, in prewar days it is estimated that Germany fed 17,000,000 tons of potatoes to livestock, while in the postwar period it is estimated at only 2,000,000 tons. On the other hand, human consumption of potatoes increased from 12,000,000 tons to 18,000,000 tons.

DISTRIBUTION OF POTATOES USED IN GERMANY

How used	Prewar period	Postwar period
	Tons	Tons
Animal feed .....	17,600,000	2,000,000
Human food .....	12,000,000	18,000,000
Seed .....	5,200,000	5,000,000
Alcohol .....	2,500,000	100,000
Starch .....	1,400,000	150,000
Spilled .....	4,300,000	1,000,000
Total .....	43,000,000	26,250,000

Outside Europe production of food crops increased, while meat, hides and wool remained about the same and cotton production somewhat decreased, owing to poor crops in the United States. The result was that the world supply of principal products was about normal by the end of the war, the loss in European production being compensated largely by in-

creased production outside, providing we exclude Russia on both sides of the balance sheet.

The following table shows that during the four years, 1914 to 1918, European acreage of grains decreased by 8,000,000 acres or 5 percent, while the yield of grain dropped from 4,795,000,000 bushels to 3,683,000,000 bushels, a decrease of 23 percent. On the other hand, North America gained 37,000,000 acres and 1,112,000,000 bushels, practically offsetting the loss of Europe. By 1922 Europe had regained about 400,000,000 bushels, while North America had lost about the same. The recovery of European production has been retarded by many causes, some of which are noted later. North American production has been slowly reduced under the hard pressure of two years of low prices.

SHIFT IN ACREAGE AND PRODUCTION OF GRAIN

Year	Europe		United States and Canada	
	Acres	Bushels	Acres	Bushels
	(Millions)		(Millions)	
1914 .....	174	4,795	234	5,468
1918 .....	166	3,683	271	6,580
1922 .....	168	4,061	258	6,257
Difference between 1914 and 1918.....	-8	-1,112	+37	+1,112
Difference between 1914 and 1922.....	-6	-734	+24	+789

INCREASED EFFICIENCY OF AMERICAN FARMS

To digress for a moment, it is of interest to point out the apparent increased efficiency of the American farmer under the stimulus of war prices. The following table shows an actual decrease in number of farm laborers from 1909 to 1919, yet an actual increase in total grain production and in production per farm laborer.

ALL GRAINS

Production per farm and per farmer

	1899	1909	1919
Population .....	75,995,000	91,972,000	105,710,000
Production all grains	4,163,000,000 bus.	4,564,000,000 bus.	5,186,000,000 bus.
Production per capita	54.8 bus.	49.62 bus.	49.06 bus.
Number of farms....	5,737,372	6,361,502	6,448,343
Production per farm.	725 bus.	717 bus.	804 bus.
Number of farmers, owners and laborers, male and female	10,096,621	11,908,893	10,312,871
Production per farmer	412 bus.	383 bus.	503 bus.

For eighteen months after the war, there was a heavy speculative movement of agricultural products to Europe, partly on private and public credit advanced to European buyers, and partly by speculators outside of Europe who sent goods to be put in storage anticipating a large buying demand to make up the deficit which then undoubtedly existed. This in a sense created something of an artificial situation, since the buying power of the people of Europe was not sufficient to absorb these goods in consumption nearly as fast as they were moved into European warehouses, and there appeared to be a larger consumption of imported agricultural

products than actually took place. The result was, that early in 1920, it was realized that European consumption was considerably below prewar, while we had almost normal world production, and there was accumulated considerable surplus in certain commodities, such as wool, cotton and food-stuffs, and was one of the important factors in a perpendicular slump in prices for agricultural products throughout the world. The slump in prices, of course, was naturally followed by some increased consumption and also had the effect of slowly curtailing production, and we are now only beginning to get a normal balance between world production and consumption of the principal products.

*Cotton.*—The situation can be illustrated by the study of a few commodities. The cotton situation is simple. For the eight year period, 1908-09 to 1915-16, the world consumption of commercial cotton was about 21,000,000 bales per year and production was approximately the same. By this time, however, due to the fact that central Europe was practically barred from cotton imports, that many mills had ceased operations in the allied countries engaged in war, and also the high price of clothing, the world cotton consumption fell to less than 18,000,000 bales for the four years ending August 1, 1920. World cotton production, however, had also fallen to something less than 19,000,000 bales for four years during the war, but with the two normal crops of 1919 and 1920, production recovered before consumption, and resulted in a large surplus, giving a carry-over on the first of August, 1921, of about 14,000,000 bales, or practically 10 months' supply at the rate of consumption.

However, by that time consumption began to increase, and for the last 18 months we have been consuming cotton again at the rate of 20,000,000 bales, while on the other hand, world production has fallen to 16,000,000 bales. Last year the world consumed about 6,000,000 bales more than it produced. For the coming year the prospect is that we will consume 3,000,000 bales more than produced, so that by next August the world carry-over will again be reduced to below normal. With world consumption again returned to prewar, and the production below normal, the future cotton situation appears to be very strong.

*Wool.*—Wool production and consumption had a similar story during the war and since. No very exact figures on wool consumption are available, but it is known in a general way that wool consumption fell during the latter part of the war and for one or two years after, to about three-fourths normal consumption, while wool production kept up to about 90 percent. This resulted in a great accumulation of wool not only at the end of the war but to some extent in the year following, so that by the spring of 1920 there was about two years' wool supply in the world. This large surplus was known at the close of the war, but it was confidently expected that it would be rapidly absorbed by continental Europe, due to the fact that there was a great vacuum existing there for woollen goods. The difficulty here, as in other cases, was that the sellers were looking at the needs of Europe rather than at her buying power. The need was undoubtedly existing for wool, but it took a couple of years to discover that the buying power of Europe was such that they were not going to take this surplus rapidly. The result was a perpendicular slump in wool prices and for a time a large cancellation of orders for cloth and decreased buying, a phenomenon that always occurs on a rapidly descending market.

It might be of interest at this point to observe the striking difference between a manufacturing enterprise, such as the woolen goods industry, and an agricultural enterprise, such as the production of raw wool. In two or three months after the slump in buying came, the woolen mills had closed up a part of their units and had dropped about one-half in production of goods. However, the production of wool on farms kept right on at about the same rate. One great difficulty experienced by agriculture in such emergencies is the impossibility of making any sort of a quick adjustment, either to decreased demand or increased demand, whereas manufacturing enterprises are in a position to make such adjustments at short notice. This emphasizes the importance of constantly making a study of the world agricultural situation in order to make it possible to take a long look ahead, since it is impractical to make emergency adjustments to meet fluctuating demands.

*Other Commodities.*—If we make a study of production and consumption of other commodities, such as wheat, rice, meat, sugar and dairy products, we have a similar story. European production and consumption were reduced to 60 and 70 percent of the prewar figures, while production outside of Europe was in general stimulated sufficiently to bring up world production to about normal. Again with all these commodities there was an expectation by the trade that Europe would easily absorb the increased production of the world outside of Europe, and it took from two to three years before it was clearly evident that the buying power of Europe was not going to enable the countries afflicted by the war to buy more than their prewar imports, let alone buying the large additional production which had been stimulated outside of Europe as a result of the war.

*Russian Grain Trade Shifted to North America.*—The great stimulation in production of the grain crops has been noted, as they are easily increased or decreased, and it might be pointed out here that without the complete demoralization of Russia, grain prices throughout the world for the past three years would have been much lower than they have been. Russia before the war used to furnish Europe with about 430,000,000 bushels of grain. This entire trade has been shifted since the war to North America, and the increased exports of the United States and Canada for the past five years may be looked on as simply replacing the grain furnished to western and central Europe by the old Russian Empire.

## TRADE BALANCES

## All Grains

Year	Net exports (Million bushels)			Europe (excluding Russia)	
	United States	Canada	Russia	Net imports (Million bushels)	Percent of prewar imports
1911	152.6	69.6	542.7	1057.0	...
1912	181.3	109.4	344.1	1097.2	100
1913	222.2	188.5	406.5	1089.4	...
1914	284.7	110.0	232.4	781.	74
1915	213.2	189.1	25.2	762.	73
1916	410.7	301.0	27.4	832.	79
1917	336.7	246.1	....	514.	49
1918	403.1	110.9	....	570.	54
1919	418.7	138.4	....	730.	70
1920	372.4	163.4	....	818.	77
1921	486.0	219.9	....	864.	82

UNITED STATES EXPORTS  
(Thousand bushels)

Year	Wheat	Rye	Oats	Barley	Corn	Potatoes
1911	83,330	31	2,126	3,642	63,533	4,362
1912	109,451	501	30,374	8,332	32,627	13,466
1913	154,760	2,034	5,275	13,225	46,923	911
RUSSIAN EXPORTS						
1911	150,875	45,234	96,071	197,752	52,759	11,118
1912	102,105	26,359	58,457	127,107	30,289	9,171
1913	129,016	33,051	41,126	180,400	22,898	2,570

The return of Russia as a surplus producing country, is, therefore, one of the most important factors in the future demand for the North American surplus. It is the opinion of the best observers that there will be very little surplus in Russia for years to come and even if by some means such a surplus should be developed in a year or two, it would be practically impossible for Russia to transport even 10 percent of the surplus to the ports for export, due to the complete demoralization of her transportation system. Before Russia can return as a large grain-exporting country, not only must her production be restored but also her transportation system.

PRESENT STATE OF EUROPEAN AGRICULTURE

The future buying of American agricultural products by Europe depends on two principal factors. One is the degree to which their own agriculture recovers and can be adjusted to meet domestic needs, and the other depends on the general economic and industrial condition of Europe, which will determine her buying power for foreign commodities. Information regarding European meat production and consumption is indefinite. A late estimate of European livestock indicates at present about 90 percent as much as prewar distribution, about as follows: Cattle, 97 percent; hogs, 88 percent; sheep, 94 percent; and goats, 118 percent. Killing weights, however, are reported as from 10 to 30 percent lighter than in prewar years. In general, it is probable that meat production is not much above 80 percent of prewar production. The lack of cheap Russian grain and shortage of potato crops are important factors in holding back hog production.

From data available there appears to have been a distinct decline in meat consumption in Germany and Austria and Belgium, but little change in other countries. This is probably due in part to the fact that many European countries were on a low meat-consumption basis in prewar years. Also in most European countries there was an active increase in pasture and meadow lands during the war. As Europe has not increased her buying of products from outside, the general conclusion is that they have simply made adjustments and reduced the standard of living to meet the present situation.

*Agrarian Policies.*—That the agricultural situation is still regarded by most European countries as one of the most important economic problems is shown by the large amount of discussion that is given the subject in the press, and the amount of attention that is given the matter in legislation.

In most of central Europe the situation is extremely difficult, due to the fact that every effort is being made to keep down the cost of living, which in general means restraining food prices, while at the same time they desire to build up home production in order to avoid paying out a large part of their resources for imports. This has resulted in many countries retaining a good many of their war time policies in regard to fixing prices on agricultural products and placing embargoes on the exports of these commodities. The situation has been clearly summed up in a recent report received from our special representative on European food situations, Mr. Alfred P. Dennis, as follows:

"At a juncture when Europe is more dependent upon sea-borne grain than ever before and is less able to pay for it, it is doubly unfortunate that the recovery of agriculture should be checked by vicious economic policies, which endeavor to tide over temporary difficulties at the price of permanent future welfare. The great urban populations, particularly in the countries of debased currencies, are pinched and restless. They clamor for cheap food. The government yields to the pressure and either fixes maximum prices for food or puts an embargo on its exportation. Austrian agriculture, for example, has been sacrificed to the city of Vienna, which contains nearly one-third of the inhabitants of the Republic. The dilemma imposed upon the government is either high prices for grain and riots in Vienna, or else low prices with peace in Vienna and discouragement for the farmers. Largely as a consequence of price-fixing and obstacles to free trade in grain, 25 percent of the land under the plow in normal times has now reverted to pasture or is lying derelict. Consequently, the country is under the necessity of buying a good deal of wheat five thousand miles away in the Chicago market, which could have been grown on native farms. It is extraordinary that Austria, whose chief trouble and complaint is shortage of food and inability to pay for imports, should have permitted her native food resources to dwindle to about 65 percent of prewar capacity. It is reported that Portuguese farmers are reducing their fall sowings as a response to the low price which the Government has fixed on grain. The export restrictions imposed by Rumania, Hungary and Yugoslavia in order to provide cheap food for home consumption, have had an unfavorable effect upon agriculture. The German government requisitions quotas of domestic wheat and rye at cut-rate prices. All of which tends to put a chill upon German grain-farming. European farmers as a whole would be more cheerful and would certainly increase their production if the shackles were taken off the trade in food products. An expansion in autumn sowings is unlikely unless governments are willing to permit farmers to enjoy prices more in line with the world market."

In spite of protests of consumers, other European countries, appreciating the necessity of increasing food production, have again reverted to certain war time measures even in the last few months, to fix prices at the point where they believe production will be stimulated. For example, Spain has recently enacted a law forbidding the importation of wheat when the domestic price is under 53 pesetas per 100 kilos, which would be equivalent to about 220 cents per bushel. Switzerland has recently passed a subsidy law granting to the producers a price of 12 francs per quintal, equivalent to 60 cents per bushel, above the import price of wheat; this to apply to the crop of 1923 and 1924 in the hope of increasing domestic production. France has doubled the tariff on grain, at the same time placing an embargo on exports of wheat. Italy had doubled the tariff on meat and certain other products and placed an embargo on exports of wheat and flour.

These few cases are cited to show the extent to which European agriculture is still regulated to a considerable degree by policies originating and



established during the war for stimulating production on the one hand and controlling prices on the other.

*The European Farmer.*—The European farmer has had many uncertainties to deal with during the past five years, and it has left him at a loss sometimes to know whether his economic condition is improving or becoming much worse. Falling exchange in Europe had one immediate effect that seemed favorable at first, that of practically lifting the burden of mortgages and debts. Old mortgages and indebtedness in marks or crowns could be completely paid off with a small quantity of grain or a few head of livestock, and the European farmer in many countries found himself suddenly relieved of his old mortgages and indebtedness. On the other hand, European agriculture has depended a great deal for its financing on various rural credit agencies. While the fall in the price of money, on the one hand, relieved him of his mortgage indebtedness, on the other hand, it wiped out the capital of rural credit agencies at the same rate. This is very well brought out in a report from Commercial Attaché Smith at Warsaw, as follows:

"The depreciation of the currency has had a fatal effect on credit agricultural institutions, which had a considerable amount of their capital tied up in loans. In every loan the debtor took more and paid back less, the farmers' need for credit increased, so that fewer could be given credit. Whilst other credit institutions, which granted shorter credit, were able to withdraw their capital quickly and by different commercial and currency operations to increase their supplies, the agricultural credit institutions were forced to continually lessen their turnover and to limit the granting of loans. In the year 1921 the possibility of granting credits to farmers came to an end and since then actual credit activity has almost entirely ceased."

Another factor in at least some parts of Europe has been the change in land policies and uncertainty of land titles. The large estate owner in certain countries has not been sure whether his estate was to be divided up and distributed among smaller land holders, and in many cases where such division and distribution has been made, the new owners have been uncertain as to the integrity of their titles, with the result that owners of such land have not been willing to spend much in the way of improving the land or buildings. In general, the division of the large land holdings has so far resulted in lower production.

The difficulty of obtaining credit has also been a factor in decreasing the use of chemical fertilizers. Those familiar with European agriculture know the very important part commercial fertilizers have played in the slow building up of production during the last forty years, and the great dependence in many sections on the use of commercial fertilizers in order to keep up production. A recent report from Poland states that before the war Poland used 119,000 carloads of chemical fertilizers; which fell to about 8,000 carloads in 1921, or roughly only about 7 percent as much chemical fertilizer as was used in prewar years. On the other hand, Germany is using more potash and nitrogen than in 1914 and half as much phosphate, the total being about the same; low consumption in Poland is due to lack of home production, and the high cost of imported goods.

In general, the European farmer is complaining of hard times, although it is generally believed by observers that his economic condition is relatively better than that of many other classes, due to the fact that he is first owner of a primary necessity in a territory where his products are

far below normal needs, and this gives him a certain economic advantage, in spite of many difficulties under which he is laboring.

Europe is now a vast experimental field in different economic policies toward agriculture. It might be well to call attention to the vast importance to American agriculture of keeping a close watch upon the numerous agricultural policies and experiments that are now being made, not only as these directly affect the purchasing power of Europe for agricultural products, but also for the knowledge it will give as to the relative effect of different agricultural policies on production as well as consumption. In many cases study should be given to the effect of these policies, especially tariffs, embargoes on exports, regulated prices, fixed prices below world market and fixed prices above world market, as well as the relative effect of falling or rising exchange values on agriculture and other industries.

There are several other matters also in the economic policies of Europe which have a direct effect upon the American farmer. One of these is the stabilization of European exchange. Many governments are still spending more money than they are taking in and until balanced budgets can be established and retirement of debts seriously undertaken, this economic disturbance is sure to continue and make most uncertain the demand for agricultural products. Europe still has 3,000,000 men under arms, which on the basis of population would be equivalent to a standing army of 1,000,000 men in the United States. When we consider the relative ability of European countries to pay this enormous burden, based on unencumbered wealth per capita, as compared with the ability of the United States to maintain such an army, we get some idea of the enormous inhibitive factor that is on European purchasing power. Until a large part of this army of 3,000,000 men is put into productive industries, it will be practically impossible for some countries, at least, to stabilize exchange and to establish balanced budgets. I mention this to show how the American farmer is directly interested in many ways in European policies, even though they may seem to be a long way off and entirely out of his realm.

#### CONCLUSION

To sum up the general situation, the main effect of the war was to shift about 30 percent of agricultural production of Europe to North America, and to close Russia as a surplus-producing country for many years. During the war, and for one or two years following, Europe was able to take this increased production from North America largely on money advanced as government loans or private credit, but when thrown on her own resources to absorb this surplus, it was soon realized that the effective buying power of Europe would not enable her to do so, and this was an important factor in the perpendicular drop in agricultural prices which came in 1920. The fact that Russia is entirely out of the export market has enabled North America largely to take her place and thus move a large part of the enormous American surplus of grain production. As to the future for American grain producers, they must take into consideration that the advance of European production will more nearly take care of European needs from year to year. However, for the present, Europe is short 250,000,000 bushels of wheat and rye, as compared with last year,

and about 100,000,000 bushels short of corn. North America has about 153,000,000 bushels more wheat and rye. The present prospect is that there will be about the normal crop of wheat in the Southern Hemisphere. From July 1 to the present, Europe has taken wheat considerably below her apparent needs, and is evidently putting off a large part of her buying while their own crop lasts. Wheat and rye are in a strong statistical position with every indication that the price will average higher for the last half of the year than up to date. On this point, the following quotation from Special Representative Alfred P. Dennis, is of interest:

"Evidence accumulates that Europeans will buy bread and breadstuffs no matter how severe the currency derangement. A case in point is that the most financially distressed of all European countries in 1920 imported 613,140 metric tons of wheat and rye, and in 1921, 756,055 tons, and during the first half of 1922, 346,896 tons, although the Austrian crown depreciated during 1921 from 7,500 to 75,000 to the dollar."

With cotton it is now clear that the world production has been very much curtailed in recent years, due principally to poor crops in the United States, but on the other hand, world consumption has gone back to normal, and for the past two years we have consumed a great deal more cotton than has been produced. There is no likelihood of any rapid increase in cotton production any place in the world, hence the future price of cotton seems assured for some years.

Wool consumption after years of underconsumption during the war and since, and consequent accumulation of surplus in 1920, seems to have reached again a normal condition so far as world consumption and production is concerned. There is little likelihood of any rapid increase in sheep production in the world, the tendency in many places being a decrease in sheep raising. This would indicate that the price of wool may be looked on as fairly well stabilized for some years to come.

Of other crops in which we are concerned, sugar suffered the greatest reduction in Europe during the war, and a correspondingly enormous increase outside of Europe, especially in Cuba. Also sugar production has had the greatest difficulty in recovering in production of any important European crops; last year being only about 67 percent of the prewar production and this year about 75 percent of prewar production. It is difficult at this time to make any statement about the future of sugar owing to the uncertainty as to what low-cost production areas may still be brought in, and also whether Europe will find it profitable to return to her prewar production.

Meat production is about normal throughout the world, with the exception of Europe, where it is still believed to be at least 20 percent below prewar. There are still a few areas in the world where low-cost meat production might be developed, but many natural difficulties are to be overcome. Therefore meat production will be regulated largely by the cost of grain and forage, and I believe a careful analysis of the world situation would show that the United States, with its enormous production of corn, alfalfa and other low-cost forages, has a distinct advantage in low-cost meat production, which it will doubtless be able to maintain for many years to come.

So long as the United States exports half of its cotton crop, one-fourth of its wheat, and one-fourth of its pork products to Europe, the American

farmer is vitally interested not only in the agricultural policies of Europe but also in other national policies that directly affect their exchange and their buying power of our products.

#### DISCUSSION OF PROFESSOR MONTGOMERY'S PAPER

C. S. SCOFIELD, United States Department of Agriculture. In listening to Professor Montgomery's account of the statistical position of the agriculture of Europe in its relation to that of the United States, I have been much impressed by the thought that this whole matter is largely one of commerce and of transportation.

The condition of distress which we find in certain branches of our agricultural production is due to a rate of consumption that is below normal, rather than to a rate of production that is above normal. And this lowered rate of consumption is confined to Europe, where we have been accustomed to send some of our surplus agricultural commodities. The volume of these exportable surpluses has been very small, as compared with the volume we have consumed at home, yet the conditions of world commerce are such that the price of any of these commodities has been determined very largely by the price obtainable for the exportable surplus. In consequence, the price situation in several of our important agricultural industries has been demoralized because economic conditions have been demoralized overseas.

Except for our cotton crop, only a very small part of our agricultural output is available for export, and our agricultural and economic well being is not dependent upon such export. The returns which normally come back to us from the sale of these exportable surpluses are so small as to be negligible in the so-called balance of trade. We continue to export cereals and meat more as a matter of habit than because we now need the money, or the commodities, that we got formerly from abroad for our products.

It is to this habit of inertia of our commercial system that we owe much of our present agricultural distress. The price of the whole of our wheat crop, for instance, is determined by what the bankrupt people of Europe can afford to pay for a few thousand bushels of our exportable surplus, not by what our own consuming population can afford to pay for the millions of bushels that are used at home.

Our established channels of commerce have been in this instance, a hindrance rather than a help to our agriculture. Through these channels we have suffered in our own great primary markets the depression and poverty which have dominated the clearing house markets of Europe. It has been a case of the tail wagging the dog. Thus our agriculture has been a victim of our commerce and our transportation in far too large a measure. By this I do not mean to stress such well-worn topics as high freight rates and distribution costs. I wish rather to point out that we might be better off if freight rates and distribution costs were even higher than they are. If they were much higher we might be forced to set seriously to work to try to improve our conditions, to cast about for ways and means of lessening our transportation requirements.

Dean Russell has recently cited a case which illustrates what I have in mind. It appears that Wisconsin dairymen have been buying hay in

Nebraska to feed to cows in Wisconsin. The transportation cost on this hay is now so high as to invite attention and even criticism. Dean Russell proposes to solve the problem, not by demanding a reduction of freight rates, but by having the hay required by Wisconsin cows produced in Wisconsin.

Our agriculture has become highly specialized. We have bent our energies in this direction. We have sought to increase the efficiency of production through specialization. As a consequence we have thrown an excessive burden upon our transportation systems. We must now face the fact that our transportation system is overburdened. It is not expanding and its costs are steadily increasing. We have reached a point where transportation and distribution costs are a dominant factor in our agricultural problem. Shall we focus our attention on ways and means of reducing these costs or shall we face the task that is of nearer concern to us, that of improving conditions by striving to balance production and consumption requirements within natural areas?

We, here in the Federal service are operating under what is known as a budget system. We are making a direct comparison between income and outlay. Is it not possible to formulate for a region, for a State, an agricultural budget? In such a budget we would consider, on the one hand, what are the local requirements as to agricultural products and, on the other hand, to what extent can these requirements be met locally. In so far as local needs can be supplied locally we shall have reduced the load which our overburdened transportation system is trying to carry and shall have narrowed the spread of price between producer and consumer.

From Professor Montgomery's statement of the case, it is clear that conditions in Europe, so far as they relate directly to the prices of American farm products are not only in a bad way, but they do not promise much improvement in the near future. If this is really the situation, we can not advise our farmers that better times are just ahead and that only a little more fortitude is all that is needed to win through. We ought to face the facts and realize that our salvation is in our own hands. For 300 years we have been exporting agricultural products to Europe. In the beginning such exports were absolutely essential, for we had to have from Europe a large part of those commodities which make civilized existence possible. At a later epoch we needed European capital to develop our resources and our industries. We could pay for the use of this capital with raw materials, such as food and textiles. But finally we have reached a stage when commodities and capital are no longer so important to us.

Undoubtedly, we should foster our foreign trade. But we should find a means of fostering it that is less paralyzing to our own economic existence than we have used during the past three years. If one of our customers has become bankrupt let us develop our business with others. We may assuredly aid the bankrupt in many ways, by credit, by charity, and by sympathetic understanding. But above all we need to lead the way out of this widespread chaos of bewilderment by setting our own house in order.

W. H. STEVENSON of Iowa. There is one phase of the European situation which is of possible interest to you in view of the data presented by Professor Montgomery. European countries realize that they are not producing the amount of foodstuffs they need from year to year, and that it

is difficult to buy the necessary food. Therefore, these countries have organized definite programs looking toward an increase of production within their own limits.

Italy, with its 40,000,000 people, is encouraging agricultural production along several lines. Much money is being put into reclamation projects which will bring into cultivation a great deal of land. There is the great Roman campagna, a country, as early Roman history tells us, which was very fertile and productive, but which now, due to the breaking of the irrigation systems, and for other reasons, contains thousands of acres of uncultivated land which supports only a few flocks of sheep and produces poor crops. The government is doing what it can to reclaim these lands. Great stretches of territory in southern Italy, have dried up summer after summer, and it is necessary to put in irrigation systems there. The government is facing this problem and definite results are expected.

In Bavaria the soil is poor. It is a livestock country. Much progress has been made in improving livestock through the work of the experimental breeding farm at Munich. I visited the owner of a large estate in Bavaria, who said, "We are living on a live volcano here. I own this farm. It is a fine piece of farm land and productive, but I am not sure of my ownership. A few weeks ago a committee visited my estate and went over it carefully to find out if I was producing as much as peasants would produce if they had it." It is possible for a committee to simply confiscate a farm and turn it over to the peasants if it is thought they can produce more foodstuffs than the owner. I think it is agreed by experts that the production of foodstuffs on the large estates has been greater than under peasant ownership.

There is in Prague an experiment station, two or three years old, established for the purposes of studying the agricultural situation and telling the people how to produce foodstuffs.

In northern France there are men who correspond to our county agents and who deal with the food problem very much as our county organizations are dealing with it.

In England there are a number of experiment stations. The one near Cambridge is encouraging especially organization among farmers. The need for this is so keenly felt that much money and time and effort is being put into this new institution. It is doing a good work and I feel certain that it will be a prime factor in increasing food production, especially cereals and potatoes.

A new experiment station has been organized in Scotland to work especially along the lines of animal husbandry and crop production. The improvement of sheep is one of the definite problems to be studied.

European countries, recognizing that they are not producing the needed amount of foodstuffs, are facing the problem and are trying to solve it.

K. L. BUTTERFIELD of Massachusetts. I have long felt that American farmers as a group must consider their business in the light of world agriculture. Moreover, has not the time come when we must consider the question of American agriculture, not only from the viewpoint of agriculture in other countries, but also from that of the possible development of the world's consuming power? Can we not begin, at least, the discussion of some of the factors Mr. Scofield spoke about, viz., the tendency to

localize the production of products and the possibility of increasing certain types of products, especially fruits, vegetables, and milk, without involving so much transportation? In considering the production of staples, not only in the light of competition with other countries, but in the light of politics in Europe and in other parts of the world, are we entering upon a stage, either temporary or permanent, of extreme nationalistic industry? If temporary, what is the next step? Would not the next step tend to allocate production on national lines?

With the development of modern industry in China coming on slowly and surely, it seems to me that the question of China as a factor in food production must necessarily be one of considerable moment. Will China supply her growing industrial population or not? She is under a low standard of living now.

E. G. MONTGOMERY. Consumption of commodities can be increased if you are not already dealing with a saturated market. In certain cases you can replace one foodstuff with another—but with our great standards, bread, meats, etc., in general the market is already saturated. If you get people to eat one thing, you merely replace something else. That is probably the trouble with the American farmer. He is increasing his efficiency too rapidly in proportion with the increase in population. In 10 years the population increased from 99,000,000 to 109,000,000, and the increase in production was about 18 percent. We did that with a decrease in the number of farmers. Undoubtedly, good roads have been a very great factor, the use of gas power has been another. Horse feed is now human food, that is, we are growing wheat instead of something else. We increase our production a little bit faster than our population. We will come more and more certainly to be a self-sustaining country. That was the case if you go a little farther back. In 1900 our farmers were not increasing their production per capita. Since 1913 we have increased production at a much greater rate than the increase in population. The old law of supply and demand is at work in determining all these things. The fact that we are producing a little more may show that our farmer is a little too efficient.

Adjourned.

## SECTION OF AGRICULTURE—EXPERIMENT STATION WORK

TUESDAY MORNING, NOVEMBER 8, 1921

The meeting was called to order at 9 A. M. by the chairman of the subsection, F. D. Farrell, Director of the Kansas Experiment Station. On motion, S. B. Haskell, Director of the Massachusetts Experiment Station, was nominated and duly elected secretary, *pro tem*.

The following paper was presented by H. H. Love of the New York Cornell Experiment Station:

THE APPLICATION OF PROBABLE ERROR TO AGRICULTURAL EXPERIMENTATION<sup>1</sup>

BY H. H. LOVE

It is very interesting to note the progress that has been made in agricultural science. One need only to review the literature of the experiment stations from the time of the enactment of the Hatch Act to the present time to be convinced that there has been a very rapid change in all kinds of agricultural experiments. In the early days, projects were very general and the experiments in many cases were of a very general sort. When some of these more general questions were settled, experiment station workers then began to give attention to more specific problems. Methods to be employed were more carefully considered and a better technic has been developed in order to make the results of the experiments as valuable as possible. Gradually there has been a great improvement in the methods employed in many kinds of experiments.

Associated with this refinement of methods has been the demand for various kinds of carefully constructed and very expensive apparatus, such as high-powered microscopes, sensitive chemical balances, and the like, so that today the laboratories of many of our experiment stations are well equipped with very useful appliances. These various pieces of apparatus have aided in solving many intricate problems in connection with agricultural work.

While there has been great improvement in laboratories and in technic along many lines, certain factors have not been considered. One of these factors in technic has been that of the application of statistical analysis to the planning of experiments and the interpretation of the results obtained therefrom. One of the most important contributions of statistical methods has been the probable error or experimental error concept.

In the past few years the probable error concept has received some attention by certain experiment station workers. It, however, has not received the attention that it should or must receive. In some quarters there has been even a feeling that probable error had no place in experimental work. This attitude seems to have come from lack of knowledge of the subject or from the fact that as it is applied results thought worth while are shown to be of questionable value.

In discussing this subject, and especially in using the illustrations, it is not the intention to ridicule any work. We must all recognize the valuable work that has gone before. While it has been unfortunate that, in many instances, the probable error has not been used, we must profit by our mistakes and see to it that in the future our data are presented in the most critical way.

Regarding the application of probable error to results, Pearl<sup>2</sup> of the Johns Hopkins University insists that "an experiment which takes no account of the probable error of the results reached is inadequate and as likely as not to lead to incorrect conclusions." Wood and Stratton<sup>3</sup> of England also emphasize this point in this statement:

"With the great growth of interest among the farming community and the increasing tendency of the farmers to take note of the work of the experimentalist and to act upon it, it is becoming increasingly important

<sup>1</sup> Paper 103, Department of Plant Breeding, Cornell University, Ithaca, New York.



that due caution should be exercised by experiment station workers in interpreting their results before laying them before the agricultural public."

Allen<sup>1</sup> in discussing some of the earlier experiments says:

"It is now realized that many of these experiments contain inherent difficulties dating back to their beginning, which introduce a strong element of doubt in interpreting results. For one thing, most of the published reports fail to describe the soil except in the most general way, and lack information as to the condition and previous treatment of the field, indications of irregularity, etc. Again, the number of check plats is usually too small, and the same is true of the amount of replication of treatment. This may account for the different interpretations made by different persons from the same series of experiments. In few cases has the necessary number of checks and duplicates been worked out mathematically for such experiments, and where there is considerable variation in different parts of a field, averages may furnish a doubtful basis for measuring the effect of treatments.

"In many of the feeding experiments, also, the unchecked sources of possible error are too great for safety. The small number of animals in the lots gives large chances for the influence of individual variation. The conditions and frequency of weighing may also give misleading indications. Some of the results of such experiments can be measured quite accurately, while others can only be described. Some are not strictly experimental because they embody so many factors not under experimental control and whose probable variation can not be estimated. This is true, as Dr. H. H. Mitchell has recently shown, of the cost of financial returns in feeding. Such results lack permanent value, and are likely to be given a prominence and an application which they are not entitled to."

Now what is the nature of the probable error and of what use is it in relation to experimental work? The probable error concept is concerned with the fact that when a mean or other constant is determined for a group of individuals, such mean does not give the true value for all the possible individuals in the material under study but only for those observed. Due to variation the mean of another sample may be different. That is, if 100 men be measured as to height and their average height recorded and then another lot of 100 be measured, and so on, it will be found that the means obtained will differ from one another. It is seldom that two give the same average. It is apparent then that the average of a set of observations is not a definite point but a point about which several averages of similar material may vary. Probable error then has to do with the fact that variation occurs in all kinds of experiments, for, as Mercer and Hall<sup>2</sup> found, a very cursory examination of the results of any set of field trials will serve to show that a pair of plats similarly treated may be expected to yield considerably different results, even when the soil appears to be uniform and the conditions under which the experiment is conducted are carefully designed to reduce errors in weighing and measurement.

As stated above, the probable error is dependent upon and measures the variation that occurs in observations. Take, for example, an experiment which may be performed by anyone, that of tossing a number of pennies and counting the number of "heads." Suppose one tosses eight pennies and counts the number of heads that are up in the toss. Now the most probable number is four heads and four tails, yet a large number of tosses will fail to produce this result. Since four heads is the most probable result the mean of say 20 tosses will be close to this, yet it will likely deviate somewhat from this value and this deviation will be measured by

the probable error. That is, in this experiment the observations will vary around the most probable result and likewise the mean will vary from the expected number of four heads and four tails.

In the following table is shown the result of tossing 8 pennies 20 times and recording the mean number of heads, repeating the experiment 40 times.

RESULTS OF TOSSING 8 COINS 20 TIMES AND REPEATING THE EXPERIMENT  
40 TIMES

Mean number of heads 8 coins	Number of times mean occurs	
3.45	1	
3.55	1	
3.60	1	
3.65	1	
3.70	1	
3.75	1	
3.80	1	M = 4.0475 ± .19
3.85	4	
3.90	3	S. D. = .280
3.95	4	
4.00	4	
4.05	1	
4.15	1	
4.20	5	
4.25	2	
4.30	2	
4.35	2	
4.40	2	
4.45	1	
4.50	1	
4.75	1	
N = 40		

The above table shows a great variation of means. It is not surprising then that, with the various kinds of agricultural experiments, similar trials give results that diverge greatly from one another.

Now the probable error will show the amount of this variation and the limits which mark off the expected variation of any number of means similarly obtained. That is, the probable error is based on the deviations from the mean or average value and is such that when it is added to or subtracted from a mean or other constant there is an even chance that the true value lies within these limits.

The probable error is of such nature that if a number of determinations were made on similar material the observations will tend to group themselves around a mean and then fall off on either side of this mean with such regularity that if they were arranged according to the size of the deviation a curve of error will be formed similar to the normal curve.

The following illustration from Wood and Stratton will show this point very well. This illustration is based on the determination of the amount of dry matter in 160 mangel roots. The probable error found for a single determination is 1.1. Now the nature of probable error may further be illustrated by measuring distances from the mean equal to 1.1. Theoretically the part of the curve included should contain one-half of the individuals. In this case we have 81:79. A further point is that any single determination is likely to fall at any point in the curve.

Now if the mean yield for ten plats of a certain variety of oats for one year is 57.3 and the probable error is 1.9, then it is a 1 to 1 chance that the true mean of this variety, under the given conditions of soil and climate, lies between 55.4 and 59.2 bushels per acre. If this is true we see

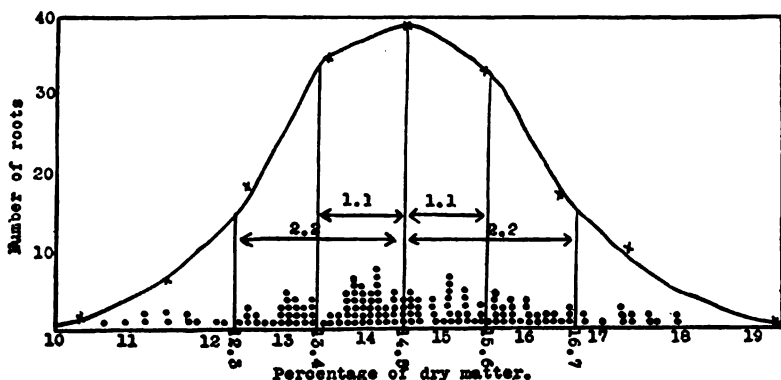


FIG. 1.—Frequency curve for dry matter in 160 mangel roots, showing probable error.

at once that under ordinary circumstances it is futile to draw any conclusions as to the difference between varieties or plat yields when they differ by only three or four bushels per acre.

All kinds of experiments are subject to error and the recognition of this fact should be shown in the planning of plat cultures, soil plat work, water cultures, variety tests, feeding experiments, in fact, in practically all investigations which an experiment station is apt to be carrying on.

As has been stated, the probable error is such as to denote the probable variation of an average or other constant, and in so doing gives an indication of the reliance we may place on the results. The probable error does not have anything to do with the accuracy of the work. Neither does it correct for errors in calculation.

In passing it may not be out of place to remark that in many cases errors due to faulty arithmetic are many and in some cases the results obtained would be differently interpreted had the arithmetic been more carefully done. In order to have my students in biometry grasp this point, each one is required to review some station bulletins to see how common it is to find such errors. This is not done to belittle any one's work but to show the student that carefulness in biometry takes the place of cleanliness in the old adage, "Cleanliness is next to godliness."

The following table gives some illustrations of errors as found in different publications. It is found that errors of greater or lesser magnitude are found much too frequently.

TABLE SHOWING ERRORS IN CALCULATION  
(Selected from station bulletins)

Published .....	27.86	30.68	30.91	33.63	33.82
Corrected .....	23.88	26.29	26.49	28.83	28.99
Difference .....	3.98	4.39	4.42	4.80	4.83
Published .....	34.07	34.89	33.52		
Corrected .....	29.21	29.91	30.16		
Difference .....	4.86	4.98	3.36		

## FERTILITY TEST—OATS

	Yield of grain	Calculated check yield	Published increase in yield	Corrected increase in yield
C .....	26.95	.....	.....	.....
	62.89	30.15	32.74	.....
	53.28	33.35	19.92	.....
C .....	36.54	.....	.....	.....
	49.30	36.94	8.23	12.36
	60.30	37.34	15.13	22.96
C .....	37.73	.....	.....	.....
	66.00	36.79	28.38	29.21
	62.65	35.85	26.79	.....
C .....	34.92	.....	.....	.....

Character No.	M		S		C	
	Published	Corrected	Published	Corrected	Published	Corrected
1	637	637	13.62	138.30	2.08	21.71
2	1392	1392.7	22.47	225.2	1.614	16.17
3	374.1	374.1	10.20	102	2.72	27.27
4	6.7	7.7	1.12	1.13	16.71	14.68

The probable error in experimental work serves in two ways: First, its calculation aids in interpreting results and showing how much dependence may be put on any data and, second, it aids in planning future experiments on the basis of the experiences of the past.

How does the probable error aid us in interpreting our results? Suppose one is interested in variety trials and has obtained the yields of two varieties which have been tested on ten plats each and finds for variety A a yield of 48.4 bushels per acre and for variety B a yield of 43.6 bushels per acre. Can we say with accuracy that A is a better variety than B? The difference is 4.8 bushels. Now it is not an uncommon practice by any means to say that one variety is better than another when the difference is 4.8 bushels per acre. Yet let us see what the probable errors tell us. Since ten plats were grown in each case, it was possible to calculate the probable error for each yield. This was found to be 2.2 bushels for A and 1.3 bushels for B. This shows us that the yield of A or B is not a definite value, but upon repetition of the experiment, according to what has been said earlier, it is an even chance that the means of the new trials will lie within the limits indicated by the value of the probable error. So for A we have  $48.4 \pm 2.2$  bushels, and for B,  $43.6 \pm 1.3$  bushels. It is clear then that the means for A may fall within  $48.4 \pm 2.2$  or 46.2 and 50.6. It is also equally probable that a new mean for this variety under similar conditions will fall without those limits. So for B the limits are 42.3 and 44.9. Thus, we see that if in another experiment the mean of A varied in the minus direction and the mean of B in the plus direction, there would be little difference between the varieties. The theory of probabilities gives us a better means of comparison, however, in obtaining the difference between two such means and the probable error of this difference. This probable error depends upon the probable error of each mean and is equal to the square root of the sum of the squares of the two probable errors. Thus, in this case we have a difference of 4.8, with a probable error of 2.6. Is a difference of  $4.8 \pm 2.6$  statistically significant? This is found by dividing the difference by its error, which in this case gives 1.85. From a

table of probabilities we see that the chances are about 3.7 to 1 that this difference is significant. Without going into too much detail, it is sufficient to say that usually odds of 30 to 1 are as low as we ought to accept when measuring differences. The result given above shows that due to chance alone we may get a deviation as great as is shown once in five trials.

As to how the calculation of errors will help us in planning other experiments, we may make use of the results we were just discussing. If ten plats do not show that a difference between two varieties of 4.8 is significant, how many plats should be used under similar conditions to measure such a difference? Now, from results at hand, it is possible to find that the probable error of a single plat is about 13 percent and from this we can find by a simple formula that it will require about 90 such plats in order to measure a difference of 4.8 bushels per acre with any degree of precision.

The above discussion indicates that the results of single plats or tests of any kind are apt to be very misleading. Gregoire<sup>4</sup> shows that:

"Results from a single plat are almost worthless. The probable error is decreased by increasing the number of plats, which should not be less than three. With larger field experiments it is very difficult to keep the probable error below 10 percent, and generally impossible to keep it below 5 percent. This indicates that the large majority of the results of field experiments, as ordinarily conducted, are not only not worthy of serious consideration, but may be a veritable detriment to practical agriculture and discreditable to agronomic science."

Suppose we examine another case to see what the probable error will show in connection with some work in rate of seeding experiments.

#### RATE OF SEEDING TEST WITH WHEAT

##### Valley

Year	6 pecks per acre	8 pecks per acre	Year	6 pecks per acre	9 pecks per acre
1897	20.33	20.25	1897	20.33	20.08
1898	17.04	21.59	1898	17.04	21.54
1899	23.33	23.24	1899	23.33	26.16
1900	8.08	10.33	1900	8.08	9.56
1901	21.96	22.75	1901	21.96	21.00
1905	22.63	25.42	1905	22.63	24.29
Ave.	18.89	20.60	Ave.	18.89	20.44
Odds 27 : 1			Odds 16 : 1		

##### Fultz

Year	6 pecks per acre	8 pecks per acre	Year	6 pecks per acre	9 pecks per acre
1901	19.88	20.83	1901	19.88	21.58
1902	23.58	24.33	1902	23.58	25.66
1903	35.17	35.00	1903	35.17	38.58
1904	14.56	16.95	1904	14.56	16.83
1907	32.21	32.66	1907	32.21	31.83
1908	41.04	39.96	1908	41.04	41.37
1910	35.37	34.71	1910	35.37	33.50
Ave.	28.83	29.21	Ave.	28.83	29.91
Odds 3 : 1			Odds 11 : 1		

The author concludes that eight pecks of wheat per acre give the best returns, nine pecks next best, and six pecks next. Now with two varieties the odds are 27:1 and 3:1 that eight pecks are better than six. For the

same two varieties the odds are only 16:1 and 11:1 that nine pecks give better returns than six. It is evident that in interpreting such results one should be very careful to note whether the differences are really significant.

Another case may be cited in connection with variety tests. In a test of spring wheat a 4-year trial gave the yield of one variety as 29.3 bushels per acre and of another as 24.6, and the statement was made that the first variety outyielded the second. The probable error shows that the odds are only 12:1 that this is so.

In variety tests reported at another station, it is shown that certain sorts have been the best for a period of five years, yet when we apply the probable error concept we find that there is very little difference between the several sorts that rank among the best in yield. As a matter of fact there is no significant difference between the variety ranking first and the one ranking twentieth. That is, the odds are only about 19:1 that the difference in yield between the first and twentieth is significant, although the yields are 73.48 and 64.73 bushels per acre. From these results it is clear that one should be extremely careful in recommending varieties for general use when the trials have shown a difference in yield of only three or four bushels, unless this has been a result of many trials over a period of years.

Let us now consider some cases in which data of feeding experiments have been presented without considering the experimental error. The analyses of the results of a number of feeding experiments have shown that the probable error for one steer, expressed as a percent of the live weight increase, is about 14 percent. Since this is the average probable error it should be taken into account in planning and interpreting results.

A station publication reports an experiment with steers in which a comparison was made between those fed in a barn and those fed in an open shed. There were twelve animals in each lot and they received the same treatment except shelter. Those fed in the barn showed an average gain for 126 days of  $266.7 \pm 8.8$  pounds, while those fed in an open shed showed a gain of  $247.7 \pm 7.4$  pounds. The difference in gain between the two lots is  $19.0 \pm 11.5$ . As this result is not even twice the probable error, such a difference might well be due to variation or chance. As a matter of fact, when the errors in the tabulated data as published have been corrected the results are  $269.0 \pm 8.8$  and  $252.0 \pm 7.9$  and the difference is  $17.0 \pm 11.8$ . We see that the difference is even less than before and the probable error is slightly higher.

In another publication from the same station we find that it was concluded that open-shed feeding gave greater gains than did barn feeding. These results are calculated on the average daily gain per head and are as follows: Those fed in an open shed showed an average gain per head of  $2.362 \pm .08$  pounds, while those fed in a barn gave  $2.138 \pm .15$ . The difference between the two is  $.224 \pm .17$ . Here again the difference is not significant and it is impossible to draw any definite conclusions from the experiment. Now the results of these two comparisons of barn and open-shed feeding are contradictory, as might well be expected from the value of the probable errors, which indicate that such results may be due to individual variation.

In another experiment where two lots of twelve animals each were used in an experiment to measure the feeding value of a limited amount of corn silage against a limited grain ration with a larger amount of corn

silage, the published results show the need for interpreting data in the light of experimental error. The rations were broken ear corn, cottonseed meal, silage, and hay or corn stover. Lot I received all the ear corn the animals would eat with a relish, while Lot II received two-thirds as much by weight. On full feed, Lot I received two pounds of cottonseed meal per head per day, and Lot II, two and one-fourth pounds. The statement of the author regarding the results is that they show "that the steers of Lot II (those fed the limited grain and the liberal silage ration) made the greater gains. Lot I gained 185.3 pounds per head, while Lot II gained 205.4 pounds per head or an average of twenty pounds per head more than Lot I. This is quite a noticeable difference in favor of the liberal silage ration and is worthy of consideration." There is, however, considerable variation and when the probable error is calculated we find that the difference is  $20.1 \pm 13.41$ , or the odds are only 2.2 to 1 that this difference is due to methods of feeding alone. From these results one can find that to measure such difference with any degree of precision it is necessary to use 23 animals in each lot.

Another experiment in steer feeding compares limited silage with heavy silage ration. The author states: "By comparing the gains made by Lot III where silage was extensively used with Lot I where it was limited, the difference is in favor of the heavy silage ration." The results, however, do not warrant such a statement, since the heavy silage ration gives an average daily gain of  $2.138 \pm .15$  pounds per head, while the limited silage ration gives  $2.099 \pm .36$ . The difference is  $0.39 \pm .30$ , which is too low to afford any basis for such a conclusion.

At another experiment station an experiment was conducted to determine the difference between use of corn silage alone and corn silage with various kinds of leguminous hay. Only four steers were used in each lot in this experiment. The results are as follows:

	Average daily gain per head	Gain over silage
Corn silage .....	$2.32 \pm .06$	
Corn silage and clover hay .....	$2.29 \pm .05$	$-.03 \pm .08$
Corn silage and alfalfa .....	$2.49 \pm .05$	$.17 \pm .08$
Corn silage and sweet clover .....	$2.45 \pm .18$	$.13 \pm .19$
Corn silage and prairie hay .....	$2.01 \pm .13$	$-.31 \pm .14$

The author concludes that leguminous hay added to corn silage gives a gain, but the facts do not bear this out. In the case of alfalfa hay added to corn silage the gain is only 7.3 percent. To measure such a gain according to the formula suggested by Wood and Stratton 54 cows would be needed in each lot. Since this is usually impossible, the experiment should be repeated several times, but with more than four cows.

Other illustrations from feeding trials could be drawn, but these will suffice to show the great need for using the probable error concept in planning feeding experiments and interpreting the results.

Some illustrations from soil experiments will also show the importance of the probable error. The following table, which gives some of the results of a soil test for one year, will illustrate the point.

CROPS IN 3-YEAR ROTATION OF POTATOES, WHEAT, AND, AND CLOVER,  
YIELD PER ACRE, 1909. WHEAT

Plat No.	Fertilizing elements			Yield bushels	Gain		Gain P. E.
	N	pounds P	K				
1	..	..	..	34.37			
2	..	20	..	40.33	4.03 ± 2.71		1.49
3	..	..	83	39.29	1.06 ± 2.74		.39
4	..	..	..	40.17			
5	38	..	..	41.17	1.56 ± 2.86		.55
6	38	20	..	43.25	4.20 ± 2.91		1.44
7	..	..	..	38.50			
8	..	20	83	40.21	.97 ± 2.81		.35
9	38	..	83	45.62	5.64 ± 3.03		1.86
10	..	..	..	40.71			
11	38	20	83	43.54	2.40 ± 3.00		.80
12	50	20	83	43.54	1.97 ± 3.01		.65
13	..	..	..	42.00			
14	50	30	124	43.67	1.89 ± 3.02		.63
15	50	30	124	44.87	3.31 ± 3.06		1.08
16	..	..	..	41.33			
17	36	12	28	44.46	4.20 ± 2.99		1.40
18	72	24	56	43.79	4.60 ± 2.94		1.56
19	..	..	..	38.12			

While the gains due to fertilizers range from about one to over five bushels, there is not one gain that would be statistically significant. Now if under repetition these yields for the different treatments continue to follow in the same order as they occur here, it will be found that some of them will, after several years, prove to be significant and show that certain treatments pay.

Another series of soil experiments may add further evidence to that already presented.

RESULTS FROM SOIL TESTS FOR THE YEARS 1905-07

Fertilizer addition	Plat No.	Value and P. E.		Net gain and P. E.		Gain P. E.
Check .....	301	\$45.31 ± 2.72				
Legume .....	302	43.59 ± 2.62		—\$2.72 ± 3.78		
Manure .....	303	49.94 ± 3.00		2.17 ± 4.05		
Lime, legume..	304	52.45 ± 3.15		7.36 ± 4.10		1.80
Lime, manure..	305	59.85 ± 3.59		8.41 ± 4.68		1.80
Phosphorus ...	306	65.47 ± 3.93		5.52 ± 5.04		1.09
Phosphorus ...	307	66.46 ± 3.99		— .89 ± 5.37		
Potassium ....	308	68.24 ± 4.09		—4.73 ± 5.67		
Potassium ....	309	69.86 ± 4.19		—4.10 ± 5.79		
	310	72.14 ± 4.33				

These results are the average gains or losses due to treatment through three years. From the figures it is seen that on plats 304, 305 and 306 there are gains of \$7.36, \$8.41 and \$5.52. These may seem to be good substantial gains until they are compared with their probable error. Then it is apparent that in no case is it certain that all this gain is due to the treatment applied.

A point that may be emphasized in passing is in reference to publishing results showing the gain or loss in dollars and cents. It is true that this makes them readily understood and easy for the reader to grasp the point, yet I believe much greater importance will be placed on a gain, say of \$2.00, than will be placed on a gain of two bushels of wheat, even though



wheat may be a dollar a bushel. That is, when money values are presented they tend to divorce the final results from the various manipulations in the experiment. It is true that results so expressed have their advertising value, and at times there may be need to so express the results, but, if so, they should be presented in such a way as to lead to no false conclusions by the reader. It should also be pointed out that the figures also have their probable error, which should be attached.

In connection with the last results presented it was possible to study the variation in the plats before any treatment was applied. In this way the probable error could be calculated, as well as the means for the different plats. From such calculations it is found, for example, that there was such a difference between Plat 305 and its comparison plat that for three years before treatment Plat 305 returned \$4.27 more per acre than did 303, its comparison plat. This fact emphasizes the importance of studying the variation in the plats before the real experiments are begun. This is extremely important and should not be sacrificed on account of the anxiety to begin the experiment. The probable error thus obtained will be very useful in the work later.

There are some other experiments that are subject to large experimental errors, and the planning of such experiments should be especially considered. I refer to experiments with trees. It is not possible to have very many individuals on one plat and the individual variability is very high. Batchelor and Reed<sup>1</sup> and Anthony and Waring<sup>2</sup> found for apples that the coefficient of variability will vary from about 20 to 40 percent. In one case a higher coefficient is reported. For other trees Batchelor and Reed report coefficients of variability of from 29 to 53 for single trees. From these figures it is evident that experiments using trees should be very carefully planned and the results presented in a most critical way.

The various examples that have been cited show that all experiments are affected to greater or lesser extent by variation and that the use of the probable error concept should be shown in the planning, conducting, and final presentation and interpretation of the results.

The probable error shows how much weight we may give to the results of any experiment and may be looked upon as the great question mark of reliability. Upon looking over the results of experiments which have been conducted, it is apparent that the probable error shows that in very many cases in crop or soil tests not enough check plats have been used. It is also clear that not enough replications have been used. One of the great difficulties has been the desire on the part of some persons to measure the effect of many treatments or compare a large number of varieties. The result has been, in many cases, that many things have been poorly determined, rather than a few things well.

In this connection, I do not mean to include all tests, for certainly in some cases experiments have been well and carefully laid out and the results are trustworthy. It is too much to say we can agree with Lipman and Linhart<sup>3</sup> in the following conclusion:

"Even when fertilizer experiments are properly planned and the results adequately studied by statistical methods, our present knowledge of the enormous variability of all soils and plants renders the data from any given fertilizer plat of value only on that plat, no matter how near the experimental one. This important consideration renders it highly probable that no fertilizer experiment, as ordinarily conducted, is possessed of sufficient

practical value to justify the large expenditure of money, time, and energy involved."

Such a statement, without the presentation of the results on which it is based, renders it difficult for one to know just what methods have been used. Such a sweeping statement, if given credence, is apt to jeopardize the very good work that is being done in many places. As a matter of fact, I can not with the same data (so far as I can determine) come to the same conclusions. Certainly some of the experiments mentioned by Lipman and Linhart, when treated statistically, show beyond any question of doubt that the addition of fertilizers have given some very substantial gains.

This suggests that while we should be very careful to use the probable error wherever it is possible, we should also be very careful in its interpretation. Some are apt to calculate the probable error and draw deductions from experiments which, by their nature, will lead to high probable error values. In such cases the greatest care should be exercised in discussing the data and one should determine whether the proper methods have been used before any generalizations are made.

In conclusion, it is well to state in brief what the probable error does. By its calculation we determine whether any set of data is of sufficient value to warrant definite conclusions. The results may be such that in connection with their probable error they may be suggestive of certain facts, but do not prove them absolutely. If the points are not proven, as may be indicated by the probable error, it is possible to determine how many similar experiments must be conducted to prove the points and how many plats or animals, or trees, or what not should be used in future experiments.

We learn from experiments the variability of the material in question and can plan new experiments in the light of the results of those already done. Thus, the use of the probable error concept will aid us greatly in the new experimental work.

In this connection it may be said that it will not be possible for every worker, in whatever line he may be, to become thoroughly conversant with the technic of biometry. It is possible, however, for him to see wherein it will benefit his work and to appeal to those trained in its use. Each experiment station should look forward to having at least one investigator trained along these lines to serve in an advisory way relative to planning experiments and interpreting the results. It is admitted at once that such an arrangement may lead to complications. It is better, however, to have such complications occasionally than to continue to put out results inadequately analyzed, or to plan new experiments that can not by their nature prove the points in question. This is very important in connection with planning new experiments. It seems that there should be no authorization of funds for projects that are not carefully planned in the light of present-day knowledge.

In answer to the criticism of some that the probable error can not be applied to a small number of observations, it is well to add, that if this is so we should place little dependence in a mean or other constant obtained from a few observations.

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In discussing this paper, R. L. Watts, Director of the Pennsylvania Experiment Station, expressed his endorsement of the idea that each station should have an expert in biometrics. He suggested that three or four schools conveniently located might offer courses in the subject for station workers.

The following paper was presented by E. W. Allen of the United States Department of Agriculture:

## RELATION OF THE EXPERIMENT STATION TO GRADUATE WORK OF THE COLLEGE

BY E. W. ALLEN

As you are aware, there is a tendency in a considerable number of institutions to link up quite closely the experiment station activities with the graduate work of the college. The connection applies not only to the experts themselves, who are conducting both station investigation and graduate instruction, but extends to the graduate students who are working for advanced degrees. These, by reason of research fellowships or appointment as graduate assistants, are becoming part of the working force of the stations in considerable numbers. Frequently, also, the experiment station series supplies the avenue for the publication of graduate work. I propose to discuss the subject from the standpoint of its relation to the experiment station, and also from that of graduate instruction.

Probably no other agency has done more to stimulate interest in graduate study along agricultural lines than the experiment station. In the early years it supplied the main examples of investigation in agriculture, and by its usually close association with the teaching departments it afforded opportunity for occasional students to come into contact with research. The few who took up advanced study were likely to be quite closely associated with the station because the facilities, as well as the advanced teachers in agricultural subjects were to be found there, and the station frequently offered some opportunity for earning a small stipend to help out the cost of graduate study. To an extent, therefore, the experiment station was the graduate school of the college, or took the place of one in limited form.

Gradually this grade of instruction developed in volume and took its place as one of the distinct lines of activity to be fostered by a teaching institution. Special provision was then made for it at a number of colleges, with a more or less formal organization and machinery of its own. The fact, however, that the experts connected with the stations, by reason of their being engaged in advanced investigation, were likely to be sought out by advanced students, led to the continuance of a quite close relationship, and this was fostered by the fellowship plan. The desire to encourage worthy students resulted in scholarships or fellowships, with contributions from industrial concerns or other organizations for investigations to be conducted frequently under the direction of the experiment station. The latter was itself sometimes drawn into the subsidizing of advanced study out of its own funds, by providing fellowships or positions as research assistant for students who should spend part of their time on the work of the station.

The growth and extent of this practice has involved the stations quite closely in the graduate work, especially as relates to the thesis work for degrees. It is not confined to candidates for the doctor's degree, but includes those studying for the master's degree. In some instances the investigation in a station department may consist almost entirely of students working for degrees, while in others the progress and the course of the station projects is contingent to no small extent on the supply of applicants for graduate study and the lines they choose to follow. These in turn may be influenced by the size of the subsidies or scholarships available through the experiment stations, and to meet this competition there has been a tendency to increase the amount.

In some instances there is pressure on the part of executives to provide places for graduate students through the stations; sometimes it is becoming a part of the policy of station authorities not only to utilize such help where practicable, but to rely upon it to an important extent. In such cases, departments of the station, instead of being given trained people to help carry out their investigations, are allotted one, two, or more research assistants, a part of whose time is available from their graduate studies. Again it happens that a department head may secure the acceptance of a research project under the station funds with the express purpose of dividing the support so received among one or two graduate students working in the department for degrees. Portions of the problem are assigned to them, and the progress of the project depends largely upon what they accomplish.

When the extent of this practice was smaller it was of less importance. Then it was an incident, where now it is sometimes becoming a considerable feature—a recognized policy on the part of college and station authorities, and conditioning the type of help employed in research. It may result in more research of a certain type, sometimes that which advances the lines of inquiry the station is engaged upon; but there are some evidences that the practice is affecting the systematic progress of station projects, and that it is decreasing the identity and strength of the station as an organization. In so far as it distorts the purpose of the station, subordinates it to the other functions of the college, or detracts from its individuality, either within or without the institution, it deserves to be considered strictly on its merits.

I have no disposition to disparage the employment of graduate students in the work of the experiment station where it can be done to advantage. I am in sympathy with the interest which stations have taken in the measures for preparing recruits for agricultural investigation. But their participation in such training is quite another matter, which they should be free to determine on individual merits. To require that out of their meagre funds they should subsidize graduate students, who may or may not elect a station career, is imposing a burden they ought not to carry and is confusing the educational and research functions.

Station investigation in its present stage is largely a work for experts. The supposition is that the most capable people to be found will be sought out and employed in carrying it forward. The station has had to depend upon part-time teachers in the colleges; it can ill afford at this juncture to depend to any essential extent upon the assistance of students in pursuit of degrees.

It is important to recognize the limitations which usually pertain to such help. At best, such assistants are temporary, and are primarily interested in advancing their education. They are concerned in meeting the requirements for a degree. Usually they have much to learn through practice before they can do independent or advanced work, and they must be given different treatment from an assistant or associate.

Obviously the advantage which a student assistant may be in station research depends upon the class to which he belongs. He may be immature and untrained, attracted to graduate work by the interest he has acquired in research, or he may be a more mature person with experience in agricultural investigation and desiring to broaden his special training. The less well prepared workers will require to be trained, guided, and inspired, as well as supervised, and this may impose a considerable burden upon the station specialist under whom they are working. Such attention is not like group teaching or formal courses, but requires individual treatment.

Manifestly the course of the experiment station can not properly be determined by the demands for graduate instruction. Its program reflects the needs of the agricultural industry for systematic lines of inquiry, which have been determined upon deliberately and must usually extend over a considerable period. The systematic and orderly progress of its studies, therefore, constitutes its first concern. These need to be adequately provided for, and in the nature of the case they can not be contingent on registration in the graduate school. If graduate assistants can be used to advantage, as they often may be, well and good; but the station should not weaken itself or its force by reliance upon them.

It will be recognized that station projects ought to advance in a systematic way, one step after another, each step a logical following out of what the previous steps have shown or suggested. But it is often difficult to harmonize these essentials with the conditions of graduate instruction. To satisfy the requirements for advanced degrees, student assistants must be assigned to advanced lines of investigation which will involve opportunity for originality. To supply themes for theses, station problems frequently have to be broken up into small parts, with the result that the work on the problem as a whole may be fragmentary and disconnected; and essential phases are interrupted because of contingencies or the preferences of advanced students who present themselves. In addition, there is

the uncertainty of fellowships derived from outside the institution, which may be discontinued before the work has been finished. This has happened in a number of cases, to the embarrassment of station projects not otherwise provided for.

These things limit the dependence which can properly be placed on such help or such a system. For the orderly progress of its chief investigations the station must rely upon a corps of trained workers.

Furthermore, from the standpoint of the student, certain considerations are imposed. It is not as though the graduate assistant were seeking to gain experience, to learn methods and procedure by practice, and to absorb information through association with specialists; but he is working for a degree and must meet the requirements of the graduate school in that respect. Accordingly, too much direction, determination, and interpretation on the part of the teacher-investigator robs the student of his opportunity for independent work. It will not do to exploit him by providing the station investigator with added help to advance his own studies. He ought not to be made a tool in the hands of his teacher. Yet some stations have confessedly been led into the plan of graduate assistants partly from considerations of economy, as a means of securing cheap help.

If students are utilized on routine or prescribed details of investigation, they will not be doing the independent work expected in advanced degree courses. The temptation to use the technical skill of the graduate student in this way may be strong. It is the easiest course for the investigator and contributes most to the progress of his own line of investigation. It may yield the greatest return to the station, but it is obviously unfair to the student.

On the other hand, care must be exercised not to assign to the graduate assistant problems which are too ambitious for him to do independent work upon. Direction and close supervision are opposed to the spirit of graduate study, in which independence of thought and action are encouraged. The student needs to be given more latitude in what he does and the way he does it than in the case of regular assistants. He must find out for himself what to do and how to do it, and what the results mean. Otherwise an important part of the pedagogic value is sacrificed.

Graduate work is essentially a teaching function. The college and not the experiment station is responsible for it and for the provision of facilities which will promote it. Economic problems, such as constitute the large bulk of station research, are not necessarily the best type of inquiry for the graduate student.

One institution which has had a large number of industrial fellowships and has recently made a study of the subject has expressed the opinion that "in the long run more will be accomplished for agriculture if the funds available from private sources are used to employ trained investigators, men who have completed their graduate work." If this is true of such contributions from outside the institution, it applies equally to research fellowships supported from station funds. Generally the station can use its funds to better advantage, and it should be free to follow its judgment.

Time was when the experiment stations were under considerable pressure to utilize student labor in their experimental work. The fallacy of this as a requirement has been recognized and the practice done away with. It would be a vicious principle that required the stations to divert their

funds to assisting graduate students when not clearly to the advantage of the stations to employ them.

For the experiment station, investigation is a primary function. Only to the least possible extent ought it to be contingent on other branches of activity. It ought, so far as possible, to be sufficient unto itself, competent to do its own work. So far as it can make use of other agencies, well and good, but its own advantage is bound to be the determining factor, and this deserves to be carefully weighed.

#### DISCUSSION OF DR. ALLEN'S PAPER

EDWARD C. JOHNSON, Director of the Washington Agricultural Experiment Station. After listening to the able paper by Dr. Allen, I think all of us are agreed that the program of the experiment station should not be permitted to be modified by the fact that research fellows and graduate students may be employed, nor should they be used in such numbers that the station becomes dependent upon them and its identity as an organization be imperiled or destroyed. If their work can not fit in with the objectives of the station, as carefully outlined by the director and staff, station funds should not be used in their employment nor should the time of experiment station men be devoted to directing their activities. I agree with Dr. Allen's statements that, "For the experiment station, investigation is a primary function" and that, "Only to the least possible extent, ought it to be contingent on other branches of activity." The function of the experiment station should never be lost sight of, whether graduate work is undertaken in connection with it or not.

It would be well for us perhaps to spend a few additional moments in considering just what effect graduate students will have, first, upon the station program itself; second, upon the investigator, and third, upon the students, and then to review briefly just what the stations experienced in graduate work have to say about policies. In order that we might do this the more effectively, I used that doubtful expedient, the questionnaire to station directors, and was much delighted to have within a couple of weeks, replies from the directors of forty stations, the Washington station making the forty-first. Here and now, I want to express my appreciation to these directors and the splendidly comprehensive replies which so many of them made. It is on a careful study of these replies and of a preliminary copy of Dr. Allen's paper, which he kindly sent me, coupled with the experiences and suggestions of my colleagues at the Washington station and the experience of the writer, that this discussion is based.

One of the fundamental reasons why graduate work in connection with experiment stations has grown to considerable proportions is that the quantity of station work that can be done has been increased materially through the use of graduate students. Those engaged in such work have found that they can accomplish more with one, two, or three graduate students working with them than by working alone. Many or all research men face financial limitations which prevent them from accomplishing as much as they would like and they have found the graduate students a source of help. For that reason, if for no other, they have encouraged them. They have done this in spite of the fact that absolute reliance often can not be placed on the results obtained by such students unless their

work is done under exceptionally close supervision, and this they have been willing to give in order that the program of research might be the more rapidly promoted.

That too many graduate students hamper station projects and that poorly trained students can not be of help, I am sure all are agreed. No one whose primary function is research and experimentation can afford to accept very many students requiring detailed direction nor should he be expected to accept as workers, in close association with himself, students who are not thoroughly acceptable to him in training, personality, and purpose. In order that a project may progress, the graduate students selected for work in connection with it must have such originality, initiative, and training that they can go ahead with some phase of the project without too much supervision. Unless they are able so to do, it would be better for the station program, for the investigator, and for the students that they be not encouraged in their desire for graduate work.

The effect of graduate students upon the investigator, I believe to be of benefit, in the majority of cases. Everyone has more or less social instinct and likes to share with others his daily interest. The trained specialist, or "researcher," as Dean Vivian puts it, is no exception. He likes to share his own enthusiasm with some one, and in so doing, he not only breeds enthusiasm in those privileged to work with him, but adds to his own. He must sell his idea to the student. He must support his theory. He must explain so as to be understood. This he soon learns to enjoy and his mental acuteness is enhanced thereby.

The effect upon the investigator depends a great deal upon his own personality and upon the personality of the student, and no hard and fast rules can be laid down. Where his personality is such that he welcomes a graduate student, the latter is an inspiration to him. On the other hand, there are men of such temperament that graduate students working with them would be regarded as a nuisance rather than a help. In such cases, no benefit can accrue either to the project, the project leader, or to the student involved.

The effect upon the student himself, of an opportunity to serve as research assistant, in connection with an experiment station project, can almost universally be considered beneficial. Many of the station men that we have today at one time or another served in the capacity of research assistants. Often they became interested as a result of services performed in connection with station projects when they were students. They acquired the spirit of research found in every active experiment station. Here they associated with those who live and think experimentation and research. With them they experienced some of the joys of exploring and expanding the confines of human knowledge.

Even though the graduate student is asked to do a considerable amount of routine work in connection with his problem, through this very routine he gains experience, learns how to use the tools and methods of research, expands his own field of knowledge, and enlarges his interests. Even the routine functions, therefore, to which many students are assigned for part time, unless overdone, can be of very real help to them. The fact that some of the pedagogical value may be lost through the necessity for close supervision in order that the student's researches may contribute towards the main project or problem would seem to be more than over-balanced by



his close association with a comprehensive research program with certain specified objectives and by the inspiration and desire for knowledge that comes from a realization of the part that his own particular work contributes to the project as a whole.

Some graduate students stay at one particular institution not to exceed a year and, therefore, their work can not help but be fragmentary. Many other, however, remain for two, three, or more years, until they secure their doctorate. Their stability is almost as great as that of many of the younger station men who move from place to place as openings occur elsewhere. Largely from such men our station personnel will be recruited in the future.

In connection with this whole matter, I thought it would be of very real interest to this section to know just what policy or policies are followed by the experiment stations of the several States. I, therefore, summarized the answers to the questionnaire and take pleasure in presenting some of the results.

The first question I asked was, "To what extent do you use graduate students in your college in connection with experiment station projects?" Out of 36 replies, 25 stated that they used graduate students in this way and 11 that they did not, the number employed ranging from one to 15. It is noted by some directors that graduate students are used more largely in departments where much of the research is conducted by members of the teaching staff or where the teaching staff and the research staff are one and the same. Dean Mann of Cornell says in this connection: "In general, we make very little use of graduate students in those lines of work that may be definitely regarded as station projects. There is a somewhat greater tendency to make such use of graduate students in those departments where a good part of the station research is conducted by members of the teaching staff who give from one-third to one-half of their time to investigation. Where the research work is very highly developed, with investigators and funds set aside primarily for the work, only limited use is made of graduate students." On the other hand, in some stations where research is well emphasized, graduate students often are used in the most highly developed research departments.

My second question was, "How much of the station funds, if any, do you use each year to finance graduate fellowships and scholarships?" To this there were 25 replies, and out of these, 22 used station funds for this purpose ranging in amount from \$300 for a scholarship, or a small indefinite amount included in the regular maintenance budget, up to \$15,000 per year definitely budgeted for this purpose. Five institutions reported \$4,000 per year or above from experiment station funds thus used and 8 between \$600 and \$4,000. The remainder reported no such allotment of station funds but indicated, in some instances, that other funds were so used. Dean Russell of Wisconsin said, "I do not favor the development of research fellowships and scholarships to be paid from experiment station funds. Our proposition is entirely different. We pay these students for the service that they render us, but in view of the fact that only a portion of their time is employed gives them an opportunity for the continuance of their graduate studies."

To the third question, "Do you find the services of these graduate students satisfactory?" 26 reported "Yes," 3 unsatisfactory, and the re-

mainder gave no opinion. Dean Curtiss of Iowa said, "We have quite fully tried out this policy and we are pleased with the results."

Dean Mumford of Missouri said, "From the standpoint of the director, I have often remarked that the service rendered to the experiment station by some of our scholars has been equal in importance to that rendered by men holding a permanent position in the university and to whom we may be paying \$1,800 or \$2,000 a year."

To the fourth question, "In your opinion, does work with a limited number of graduate students increase or decrease the efficiency of the investigator in charge?" 25 replied that it increases his efficiency, while 3 felt that it decreases it, due to the extra duties involved in the close supervision necessary for some graduate students. The remainder were non-committal.

Dr. Lipman of New Jersey, says in this connection, "The presence of the graduate students, the need for outlining and supervising their projects, and the questions raised by them serve to stimulate the interest of the investigators in charge."

Dean Mumford of Missouri says, "It has been our experience that a limited number of graduate students greatly increases the general efficiency of experiment station workers, since the presence of advanced students, who have shown promise in prosecuting original investigations is an inspiration to the investigator. The most fruitful departments, from the standpoint of productive research in this college of agriculture, have invariably been those who have had graduate students working under the conditions described in this letter."

Dean Coffey of Minnesota says, "In the main, I think a limited number of graduates increases rather than decreases the efficiency of the investigator. The great trouble these days is, however, that when an investigator is capable of handling graduate students it is not long until he has more on his hands than he should handle and consequently the investigational work must suffer if the graduate students are to be adequately cared for."

Director Knight of West Virginia says, "In my opinion, working a limited number of graduate students vastly influences the work of an investigator. I think it is necessary only to point to a number of our most famous investigators to bear this out. Fischer in Germany, had a large number of graduate students; Ostwald had graduate students; and Remsem of Johns Hopkins had a number of graduate students. These men are all outstanding as research chemists, and if it applies to this study, why would it not apply to others as well."

To the fifth question, "Does a limited amount of experiment station funds expended for graduate fellowships and scholarships increase or decrease the amount of productive work as compared with the same funds if expended for well trained, full time members of the station staff? There were 34 replies—24 believed that it increased the output, 7 would use the funds for full time men only, while 3 mentioned specifically that funds for this purpose are needed to develop the investigators of the future.

Dean Hills of Vermont says in this connection, "I am rather inclined to believe that if we look at it purely from the point of view of the study in hand, a larger output will be secured by the use of well trained, full time staff members. If, however, we look at the matter from the broader standpoint of research in general, and if we take into account the necessity

of keeping the reservoir reasonably well filled, it is doubtless better to use fellowship funds to some extent in the encouragement and support of recent graduates."

Director Patterson of Maryland says, "I believe that station men should give a few, at least one and not more than ten, lectures to advanced students in order to make them summarize and crystallize their work."

Dean Russell of Wisconsin says, "My feeling is very strongly in favor of a limited number of graduate students being developed in connection with our investigational work. We favor the development of this work for its influence upon the graduate school, and at the same time we are able to get a much larger number of men interested in research work than would be the case if we were to confine our attention wholly to full time members, where our available funds would not be sufficient to give the possibility of encouragement to as large a number of men."

In conclusion, while it is quite clear that there is some differences in policy in the several States with reference to the relation of the experiment station and graduate work, a large proportion of the stations already are using some station funds for research fellowships and scholarships. The preponderance of opinion seems to be that the services of graduate students in the main are satisfactory, an inspiration to the investigators, and a help to the station program. That it is of benefit to the student and that some such relation of experiment station or graduate work is needed in order that the "reservoir" of station men may be filled, seems to be quite generally accepted. Coupled with this, however, there seems to be almost a universal sentiment that the number of graduate students working with any one investigator should be small, the quality high, and the amount of station funds used in this way limited, or the program of the station will suffer in consequence.

J. G. LIPMAN, Director of the New Jersey Experiment Stations. I believe personally from experience in New Jersey that if an experiment station had \$10,000 and we paid \$5,000, or half of this amount, to the man in charge of the project and employed five graduate students, we should get a great deal more from the investigations than if we employed two assistants at \$2,500. Those of us who have dealt with graduate students, who have had the experience that association with the correct type of graduate students gives and must give—those of us who know what graduate studies should be, who have been associated with the experiment stations, will answer the question in the affirmative, even though we must note the disadvantages pointed out by Dr. Allen and Director Johnson.

I recall that on my last visit to Rothamsted, Dr. Russell was eager to tell me that he had established connections with the University of Cambridge, so that the men on his staff would get credit for an advanced degree. From my experiences with graduate students, their qualifications are a distinct asset to the progress of research for which our experiment stations are responsible.

C. C. LITTLE, President of the University of Maine. In connection with this matter, there are one or two aspects to consider, particularly the effect upon the requirements for the M. S. and Ph. D. degrees. It is highly desirable to get away from featuring courses and to give the graduate student a research point of view. Therefore, I feel that when it can

be done without hampering the investigations, the practice deserves encouragement. It has a very desirable effect on instruction in general by getting the students' point of view crystallized quickly in the practice of research, rather than letting them feel their way. Then too, the value and the possible saving in expense to an institution, by avoiding duplication of research on the part of the college of agriculture by taking up some problems in the experiment station and acting with that institution, can be considerable. There is a chance to bring together the point of view of the college of agriculture and the experiment station, that is, the liaisons between these two, by having these students for which the college and station are jointly responsible. The graduate student is available for use in "mopping up" the field, clearing up various minor lines in connection with the investigations. I should say, therefore, that if it can be done without detriment to the research work the employment of a limited number of these students is highly desirable.

Dr. W. H. Jordan, former Director of the New York State Experiment Station, presented the following paper:

#### THE FUTURE OF AGRICULTURAL EXPERIMENT STATIONS

BY W. H. JORDAN

The production of human food is fundamentally the most important physical problem in which a people can be interested. Food is the basis of our physical existence. It is the sole source of human energy. Its abundance promotes commercial prosperity and gives a sense of comfort and security, while a supply just above bare necessities weakens a nation from every point of view. An insufficient supply is a disaster. The late war revealed to us in an almost startling way the relation of food resources to national strength and endurance.

Because the experiment stations deal with the problems of food production and use, and with encouraging success, the claim that these institutions are more essential to national welfare than any other enterprise supported by public funds can not be successfully controverted. They develop basal knowledge. They are a constructive effort. They deal with the conservation of resources in the most fundamental way.

The Purnell Bill now before Congress calls for a much more generous support of the experiment stations on the part of the Federal government. Such a proposition is rational. Experiment station research transcends the interests of any single State or group of States, it is national in scope and influence.

The work accomplished in one section reacts upon the agricultural efficiency of the whole country and, therefore, promotes the welfare of all the people. The great cities of the nation, north and south, east and west, are vitally concerned in the grain supply from the Middle West; the fruit from New York, Missouri, and Washington and the other fruit States has a national importance in the way of a healthful diet; and the cotton crop determines the cost of clothing. So does one section serve the interests of all others.

The question will now arise, "Do the results so far reached by the stations justify requests for additional Federal support?" Probably no

member of Congress is so poorly informed as to be ignorant of the fact that the experiment stations have greatly aided the farmer. It may not be amiss, however, to cite specific evidence on this question.

In doing this, a review of station results in all the States will not be attempted, for obvious reasons. Attention will be confined to the State of New York, not because the research work in that State is better or more important than in other States, but because of two facts, first, your speaker has some acquaintance with what has been accomplished in the Empire State, and second, there is no State where station results react upon more lines of production. It is not claimed that the benefits derived are to be credited wholly to the two New York stations. The State is greatly indebted to what has been accomplished elsewhere. Neither will any attempt be made to assign credits to the two stations.

This summary will touch upon general crop production, fruit production, vegetable production, and dairying. A complete summary will not be attempted but will cover certain of the more important results with which station effort should be credited.

In 1909 and 1919 the potato crop in New York was 48,000,000 bushels and 32,000,000 bushels respectively. In 1919, 20,000,000 bushels were sold, the returns from which were probably not less than \$10,000,000.

Nearly 25 years ago the devastations of blight so seriously menaced the potato crop that it became incumbent upon the experiment stations to study the problem of prevention. It early became evident that by spraying, the blight could be controlled with fair success. As the blight was destructive in some years and scarcely so in others, with no means of knowing what would occur in any season, the question arose whether spraying every year was profitable. In 1902 a ten year series of spraying experiments was begun, at the end of which period it was found that thorough spraying had increased the average yield 97.5 bushels per acre. Business experiments for 9 years and volunteer experiments for 7 years, carried on during the ten year period, showed an acre increase of 36 and 54 bushels respectively. As from 300,000 to 400,000 acres of potatoes are planted in New York annually, the value of this demonstration needs no comment.

The alfalfa plant, sometimes called lucerne, was introduced into the United States many years ago. In 1896 it was found in New York in small areas, but attempts to grow it in new localities were very largely failures, a result for which there was no explanation. The discovery by an European investigator of the organism for which alfalfa is a host and the demonstration, both in Europe and in this country, that in the absence of this organism the plant acquired no free nitrogen and did not prosper, added to the discovery that the medium of growth should not be decidedly acid, naturally led to the inquiry whether soil inoculation and liming would not establish alfalfa in soils so far found unfavorable to its growth.

Widespread experiments throughout the State demonstrated that sometimes by inoculation, sometimes by liming and sometimes where both inoculation and liming were necessary, alfalfa could be successfully grown where otherwise it was a failure. Soil from old alfalfa fields and cultures of the organism were distributed to hundreds of farms, the practice of liming became prevalent and in 1919 above 120,000 acres were grown in the State with a production of 258,000 tons, this being an increase in area over

1909 of 196 percent. Alfalfa is now one of the leading forage crops of the State, besides being a decided acquisition in conserving soil fertility.

Corn silage is an important asset in a great dairy State, especially for winter dairying. The silo has greatly increased the value of the corn plant as a forage crop. The production and use of silage is now established on an intelligent basis through experiment station studies of the best conditions of fermentation, nutritive value of the product and economy of this use of the corn crop as compared with the old method of handling it. In the acquisition of this knowledge, the stations in New York participated, and in such a dairy State this knowledge is greatly important.

Two instances will suffice to show the possibilities and value of experiment station investigations in vegetable culture. The production of cucumbers for pickling was in the earlier days an important industry on Long Island, especially as the pickle factories also used the cabbage and cauliflower crops. In the early nineties the ravages of downy mildew had so reduced cucumber production that giving up the growing of this vegetable was seriously considered. Station experiments were instituted in spraying with Bordeaux mixture, with the result that acre production of cucumbers was increased in three fields as follows: 23,500 to 66,700, 35,000 to 75,600, and 40,000 to 120,900—a change from loss to profit.

Cabbages are an important commercial crop in New York. The successful production of this vegetable was formerly menaced by the depredations of the root maggot which destroyed the young plants in the seed beds. Farmers appeared to be unable to cope successfully with the pest, even with screened beds. In 1907, experiments were begun to perfect the screening process, with the result that when the method was properly carried out complete protection to the young plants was afforded. When it is noted that over 30,000 acres of cabbages were grown in New York in 1919, comment appears to be unnecessary.

The foregoing are definite and illustrative results in crop and vegetable production, but by no means cover the work done.

Commercial fertilizers may now be regarded as an essential adjunct to crop production. In 1919 the farmers of New York expended approximately \$15,000,000 for fertilizer mixtures, being largely safeguarded in this outlay by station inspection. While such inspection is not a charge on Federal funds, it is an outgrowth of station activity, beginning with the station established in Connecticut in 1875.

New York is a great fruit State, perhaps second to none, certainly to not more than two. The value of its fruit output, including nuts, in 1919 was \$51,500,000, to which sum the apple crop contributed a large share. In 1896, apple growers alarmed at the advance of the San José scale and its deadly effects, came to one of the experiment stations and asked, "Do the prospects justify us in setting more apple trees?" The answer was, "Yes, no troubles of that kind have appeared, or will appear, that will not in time be controlled." It is not now possible to trace the laborious steps toward a satisfactory control of this pest by spraying, but the apple grower is not now afraid of this contribution from the land of the Shogun passed on to us by our obliging neighbors of the western coast.

Other insects that damage fruit, of which the pear psylla is an example, have been studied experimentally with encouraging results.

Before the advent of fungicide spraying mixtures, apple scab damaged the apple crop most seriously. Extensive studies of the use of various sprays have brought about a possible reasonable control of this pest.

The culture of apple orchards was at one time a much discussed problem as to methods, and the use of commercial fertilizers. A ten year study of soil culture and the use of cover crops under conditions similar to those prevailing over a large proportion of the apple area of the State demonstrated that this method of handling the apple orchard was highly profitable as against a grass sod, under the conditions involved. On the other hand, it seems to be proven that on the good apple soils, with proper culture, commercial fertilizers may be applied with a decided money loss.

New York had in 1919 over 9,500,000 of bearing apple trees with a production of 14,300,000 bushels, the production in 1910 being 25,400,000 bushels.

The production of milk is by far the leading agricultural industry of New York outside of the growth of forage crops and cereals. The sale of dairy products in 1919 brought returns of \$174,155,000.

As late as 1890, milk had not been standardized commercially on the basis of composition. Milk was just milk and was sold by the measure without reference to quality, whether for manufacturing purposes or for home consumption as such. The cheese-producing value of milk had not been established on the basis of composition nor had much been learned as to the relative cheese value of the milk of the different breeds. The effect of conditions, such as season and the period of lactation upon production was not understood. The losses of milk solids in the whey as affected by method had not been worked out. Indeed, up to 1890, cheese making was on a more or less empirical basis.

In 1891, Dr. L. L. Van Slyke, aided by Mr. G. A. Smith and others, began a study of cheese making from almost every angle, such factors being considered as breed, composition of milk, influence of season, period of lactation, and factory processes. This work was begun at the experiment station, using small quantities of milk and was extended to studies in factories.

Hundreds of observations were made at the station. In 1893, experiments were conducted in 50 different factories, using about 750,000 pounds of milk, representing the average of not less than 5,000,000 pounds, the product from over 15,000 cows. It is not possible to review here all the conclusions from these extensive and laborious investigations. The main result and one of great commercial importance, both to the farmers and the factories, was the demonstration that different milks have greatly unlike cheese values and that the percentage of fat in milk is a satisfactory basis for its purchase, either for cheese or butter making. The previous development of the Babcock test for milk fat had made it possible to use this basis in a commercial way. Now milk is purchased for manufacturing purposes in all the dairy States by the fat standard.

Nutrition researches show that the food values of milk also vary within reasonable limits with the variations in fat content, it being allowed that full justice is not done to fat-rich milks by this standard.

Milk is a food stuff critically important to the physical welfare of the people at large, especially when we consider the imperative needs of the young. But while it is so essential to children it may be at the same

time a dangerous food because of the fact that it is so often the carrier of disease germs, sometimes derived from the cow and sometimes from diseased persons with whom the milk or the milk utensils have come in contact. Milk may also be heavily loaded with germ life that affects its keeping quality and soundness. It is important that the 8,000,000 persons in New York cities and villages shall be served with clean and healthful milk. Fortunately, the bacteriologists by scientific methods, entirely comparable to those in experiment stations, have shown us how to protect the consumer against pathogenic germs by pasteurization, but this process does not render filthy milk clean. For some time milk was standardized as to sanitary quality on the basis of the condition of the premises where milk was produced. It was most irrational to score the farmers' equipment and not the milk itself, as has since been shown. This absurd method of judging milk rendered milk production unnecessarily expensive, and in the days of incompetent inspectors politically appointed, caused milk producers to suffer real hardships and unnecessary expense.

It is true beyond question, that experiment station researches have relieved this situation greatly to the advantage of all concerned. Milk is now scored on the basis of its bacterial content and extensive investigations have shown what factors chiefly influence this content and that the score-card based on stable conditions has little significance. It is shown that comparatively few factors determine the number of bacteria in milk and this knowledge has simplified and cheapened its production in a sanitary condition. In addition to this, a new method of counting milk bacteria was developed, now officially recognized, which permits of immediate and rapid scoring of milk without the delay imposed by the older culture method. These investigations, shared in by several stations, have placed the milk trade on a new basis, less expensive for the producer and safer for the public.

Feeding stuff inspection is now important to dairymen because of the use of a large list of byproducts in compounded feeds, some of them inferior in nutritive value.

In 1919 there was expended in New York almost \$83,000,000 for commercial feeds, largely for milk production. The reports of the station inspection enable the farmer to know whether he is buying oat hulls or real grain. Many buyers pay no attention to the information placed within their reach, but this in no way discredits the value of the feed control results.

The foregoing results relate almost wholly to financial returns. But what about the function of the stations in the field of education? The Federal government and the States are expending millions of dollars on college instruction and extension teaching. What is needed in order that this costly effort may be progressive and meet the problems that are constantly arising? Obviously the extension of knowledge. Let not our law makers think that our problems are all solved or that there is a great reserve of undistributed information. Nothing is more irrational than to build an elaborate educational superstructure on an insufficient foundation. College instruction would not progress and extension teaching would shrivel and dry up if research efforts were to cease. The present situation is irrational in the small proportion of funds applied to investigation. The time has come when this matter should receive serious consideration.



The foregoing summary of the results of experiment station activities is merely illustrative and includes only a small part of what has been accomplished in New York, but these instances show that experiment stations reach real practical results and are a profitable investment.

The value of farm property in New York according to the last census was \$1,908,000,000 and the value of the crop output in 1919, \$417,000,000.

If the State were to appropriate \$417,000,000 annually to its experiment stations that would be about \$2.20 for each \$10,000 of farm property and \$1.00 for each \$1,000 worth of farm crops. But the farmer bears only a small proportion of the tax, perhaps one-tenth, and properly so, for the 8,000,000 urban population shares largely in the benefits of station activity.

But what of the future? Let no one say that no great problems important to agriculture are waiting for solution. The scope of inquiry has been broadening and deepening ever since agricultural investigation was begun. It is to be kept in mind that many of the more difficult problems are on the waiting list. For reasons almost obvious the surface problems, those lying nearest to immediate financial returns, have received first attention. Much that is fundamental is untouched, as, for instance, soil problems. Field experiments, however elaborate or long continued, will not solve many of these. What are the essentials for research adequate to meet these demands? The answer is obvious, men and means—or would you say, means and men? We will not quarrel over which is the primary essential. Nothing can be accomplished except by well equipped research workers, and such men can not become a station asset without sufficient funds to secure and hold them and maintain their activities.

I am inclined to stress the man side. Science is an individual mind product. Given a man with strong research impulses and the needed mental equipment and he will arrive at results even under adverse circumstances. We are inclined to put too much confidence in organization, cooperative effort and similar schemes which are continuously coming to the front. They may be useful in applying defensive methods, but I have not been impressed with their value to fundamental research. The history of science teaches us that its great triumphs are the products of individual minds.

I have been strongly impressed with the fact that many young men seeking experiment station positions have in mind a livelihood rather than a career. In many cases they do not seem to understand their limitations due to insufficient training and lack of the research impulse. To be sure they can work under direction and execute mechanical details, but they are not promising material for advancement. It is to be feared that our college atmosphere is so largely commercialized as to discourage the growth of scientific idealism.

It is to be hoped that there is a deliberate attempt in our colleges to seek out young men who are mentally promising for the field of scientific research and encourage them to enter upon the required preparation, but it seems probable that more could be done in this direction.

But adequate funds are the other half of the situation. Agricultural research is so important as to justify enlisting in its behalf the ablest talent to be found in the various fields of investigation. This means adequate salaries and an encouraging equipment. There is no reason why Harvard, Yale, Johns Hopkins, or Chicago University should be able to offer more persuasive inducements to men of large ability than the Federal and State

governments. Can our National and State legislatures ever be made to see this truth and reach a real appreciation of the character of agricultural investigation which should be maintained? Let me repeat with emphasis that no other activity supported by public funds is so important to national strength and public welfare as agricultural investigation.

The report of the Committee on Station Organization and Policy was presented by R. W. Thatcher, Director of the New York State Experiment Station, as follows:

#### REPORT OF COMMITTEE ON STATION ORGANIZATION AND POLICY

Your committee has decided to present, this year, a discussion of the desirability of a general plan or program for the activities and development of each individual station. Several directors have already been led, either by force of circumstances or as a result of a conviction on their part of the wisdom of such a procedure, to outline a fairly definite program for the development of their station's work over a period of years. Their experience points the way to what your committee believes to be a desirable plan to be followed by most, if not all, of the individual stations.

To a considerable extent the plans of the several stations in the past have necessarily been of short range, reflecting immediate demands or response to temporary conditions. Often, too, individual preference of investigators has played a large part in shaping the lines of activity of the station. The nature of the problems which the stations now have to meet is such as to require looking further ahead and making careful preparations, as well as assuring continuance of the work. Of course there must always be provision for meeting emergency questions as they arise, and the trend of investigations can not be foreseen in detail; but this need not make the program of a research institution fortuitous or fragmentary in its larger aspects or haphazard in its planning.

Hence, it seems to be both pertinent and desirable for individual stations to carefully consider what they ought to attempt to contribute to the progress of agriculture in their own States and in the nation over a ten-year or a twenty-year period. Even though there can be no time limit placed on research projects, and the progress of investigation or the nature of general agricultural developments can not be prophesied, it may, nevertheless, be feasible to set a goal and to shape permanent plans in accordance with the object in view. Furthermore, the time has come when no single station can hope to adequately attack all the many and difficult problems with which the agriculture of a given region is confronted, and the program of any given station ought to take into account the activities of other stations in the region. This can be successfully done only if each of the several stations concerned has a fairly definite program mapped out for its investigational work.

Evidently such a program can not and ought not to be the product of a single man, but should enlist the assistance of experts in many lines to provide as nearly as possible a complete survey of the situation which the station has to face and the needs which it should fill. With this as a background, the director should be able to weigh recommendations and give proper proportions to the various features needed in the framing of a developmental program. The assistance of the farming constituency of the

station may or may not be sought in the preliminary survey and formulation of such a program, but certainly it ought to be submitted to the test of their experience and intelligence before it is finally adopted. On the other hand, it is clearly the duty of the station director and his staff to assume definite leadership in planning for the future development of agricultural research in each State.

#### ADVANTAGES OF A PROGRAM OF WORK

(a) *To the individual research worker.* There is a viewpoint, which has often been publicly expressed in the past, that research is individual in character, and that the research worker is frequently and often needlessly hampered by administrative policies, oversight, and organization. There can be no question that much of the successful research at our experiment stations in the past has been due to the brilliant ability and untiring enthusiasm of the individual scientists who initiated these researches because of their personal interest in the particular problems with which they were concerned. The opportunity for the exercise of individual initiative and a reasonable wide range of freedom in research should undoubtedly be preserved. But the time has come when the successful development of American agriculture demands scientific and organized study of many problems which are too broad in their scope to be attacked by single minds. The publicly-supported experiment stations are the agencies which rightfully should engage upon such organized studies, enlisting the combined interest and attack of men trained in all of the sciences which can contribute to the solution of the difficult and complex problems which now confront the industry.

Will the development by the station of an organized plan of attack upon such problems seriously limit or hamper the individual research worker in his freedom of thought and effort? A fairly definite station program may, to be sure, discourage impulsive undertaking of new studies and emphasize the importance of continuing investigations which are under way until they have been brought to the desired conclusion. But is this a real loss to the individual investigator? The pressure of modern science toward narrow specialization tends to limit the field of vision of the individual worker and to a degree to disturb his sense of proportion. Some of the recent examples of faulty conclusions, because of too narrow a viewpoint in the planning and conduct of the investigations, emphasize the danger of individual isolation of thought and study, and the importance of breadth of view and wideness of experience in the planning of research work. It is just this broadening influence which participation by the individual in a general plan or program tends to promote.

Also, many individual workers will undoubtedly experience an added enthusiasm for their work if they know that it is a part of a well-considered and generally-approved plan of public service. And certainly it will give to many a worker who has experienced the vicissitudes of uncertain funds and inadequate equipment an added sense of security to know that his work is a part of a general plan for which public approval has been secured and for which continuity of support has been insured.

Finally, most individual research workers would undoubtedly profit by a definite program, which serves both as a guide to future planning and

as a basis for periodic reviews of progress. Some individuals may make brilliant contributions to knowledge while using slovenly mechanical equipment, erratic mental processes, and sporadic bursts of imagination and effort; but the great majority of workers will succeed best through steady, orderly and continuous effort and progress along a well-considered pathway toward a definite goal.

(b) *To the administrative officers of the station*, an organized plan or program of work has many advantages. In the first place, it serves as the best possible basis for a convincing appeal for moral and financial support for the station. An organized program permits the station director to sound out his constituency on the question of their approval of his plans and to appeal for support on the basis of this approval when it is secured. Or, it provides a basis for amendment or alteration, if necessary, of the station's plans until they can and do enlist this approval and support. It is, undoubtedly, the duty of the director to be the leader in the preparation of plans for the development of agricultural research, but it is also his duty, as a public servant, to be sure that these plans shall fit the case and find response in the station's constituency. This duty exists quite apart from the matter of the expediency of having public support back of request for appropriations by the legislature.

In the second place, a formulated program serves as a very satisfactory basis for a survey of needed equipment and personnel at the station and for the annual budget making.

Third, a formal program offers a convenient measure of progress of station work from year to year or decade to decade; as well as a basis for judgment as to the adequacy of the station program to meet the needs of the agricultural situation within the State and region.

Further, a definitely-formulated and publicly-approved program of work will serve as the best possible basis for stability and continuity of work through the frequent changes of directors and of working staff, which seem to be the inevitable experience of the experiment stations. Far too few of the twenty or more present directors who have assumed their positions during the past two years have found in the records of their offices such a definite program of work as would make it possible to insure on their part an intelligent grasp of the present scope and policies of the station. Certainly the work of the station and the part which it is to play in the development of the agricultural welfare of the State are far too important to be made subject to the personal opinions or wishes of each new director or employee, and a statement of some continuous policy and program for the station should be available as a basis for intelligent service in its behalf by the new men who come into the organization. This does not mean, of course, that the program shall ever be so inflexible as not to admit of improvement by amendment as new men and new ideas become available to the station; but it does mean that a well-worked-out program ought not to be interrupted or abandoned because of changes in personnel, or as a result of personal preferences of new men on the staff.

(c) *To the general public*. A definite program of work and of development serves as the only possible basis for an intelligent understanding by the general public of the place of the station in the State and national system of publicly-supported institutions. The importance of such an intelligent understanding, in these days of flux of opinion with reference to the

activities, if not, indeed, even to the functions of Federal and State government, can hardly be overestimated.

Further, the preparation and submission of such a program to the consideration of organized associations of farmers within the State affords an opportunity for constructive criticism of station work by intelligent and experienced farmers who are to be the users of the results of the station's investigations, which is of the utmost advantage to both the people of the State, the legislature, and the station officials.

#### THE PREPARATION OF A PROGRAM OF WORK

In general, such a program as is here being considered should be based on a careful survey of (a) the probable development of agriculture in the State during the period to be covered by the program, and the problems which are likely to arise because of this development; (b) the proper place of the experiment station among the various State agencies for the promotion of the interests of agriculture; and (c) the relation of the activities of the individual station to those in adjoining States which serve the same general agricultural region and have, therefore, similar problems as possible factors in their programs of work.

It is, of course, impossible for any single individual or group of scientists to accurately foresee all the changing conditions which may affect the agriculture of their State or region during the future period to be covered by their program. But every experiment station staff has a group of men who have occupied positions of responsibility and leadership in the State's agriculture for many years and who, by training and experience, are at least as fully qualified to predict future developments as are any other similar group within the State. The combined wisdom and judgment of these men ought to be brought to bear upon the problem of the future development of the station's program. The results of a careful survey and thoughtful planning for the future by such a group ought certainly to provide a better basis for development of station policies than do personal preferences of individual workers or impulsive undertakings resulting from emergency demands.

The program ought to be based also upon a careful understanding of the relation of the research agency to the agencies for teaching and extension work in agriculture and the regulatory functions of the State government. Generally speaking, the members of the staff who, through years of service, have seen these several other agencies grow up, oftentimes as the result of the activities of these same men in their station work under more primitive conditions of agricultural organization, are in a very favorable position to formulate a program for station work which will adequately provide the necessary research foundation for these other activities.

The first step in the preparation of such a program is, of course, a survey of the present activities of the station and of its adequacy to meet present needs, to be followed later by a similar general survey of the probable future needs of the State and region for agricultural research. If the station work is on the formulated project basis, a simple assembling of the projects of the several departments into a collected statement should serve fairly well as a survey of present activities and as a basis for the discovery of omissions of important present needs. Future needs may be

considered both from the standpoint of additional projects in fields of work already represented by existing departments, and from that of apparent needs for investigations in new fields or by new agencies or technique.

In general, the final formulation of the program should recite: First, an outline of the general fields of research work in which it is proposed that the station shall engage; second, some general statements of the nature of the projects to be undertaken in these several fields; and, third, a review of the facilities which are available, or will be needed as additions, in order to make possible the satisfactory carrying-on of the proposed program. The detail to which the discussion of any of these matters should be carried will vary with the different conditions which the program itself is designed to meet. And, as a matter of expediency, any public presentation of the program, in printed form or otherwise, should always contain provision for its modification or expansion to meet emergencies which may arise, and such qualifications as to its binding effect upon the station or the State as experience in dealing with such matters may suggest.

It should be clear to all that one of the principal purposes of such a program is to serve as a general guide by means of which both the administration of the station and the people of the State, especially as they are represented in the legislature, may determine whether the plans and budgetary requests of any given year are in harmony with and a part of a well-worked-out and publicly-approved plan. Such a plan ought not to be so specific and so inflexible as to become a hindrance rather than a help to development of the station's attempt to meet the needs of the State for agricultural research as they arise. But if wisely prepared and intelligently followed it should serve a most useful purpose in promoting the welfare of both the station and the State.

#### RECOMMENDATIONS

In view of the discussions presented in this report and of the opinions and experiences of several directors of which the committee has had the benefit during its consideration of these matters, your committee now recommends that each individual station should undertake to outline a general program for its work and future development. Such a program should cover a period of several years, but should provide for periodic reconsideration and amendment. It should be prepared with the understanding that its terms are subject to modification or amendment as emergencies may arise or conditions change; but with the understanding that it is to serve as the general guide to the station staff, the administrative authorities of the institution, the legislature of the State, and the general public in the development of the working facilities for the station for the period covered by the program itself.

R. W. THATCHER,  
B. YOUNGBLOOD,  
E. W. ALLEN,  
E. A. BURNETT,  
F. B. LINFIELD,

*Committee.*

On motion, the report was received.

The report of the Committee on Projects and Correlation of Research was submitted by the chairman of the committee, F. B. Mumford, Director of the Missouri Experiment Station, as follows:

#### REPORT OF COMMITTEE ON PROJECTS AND CORRELATION OF RESEARCH

The need and the attendant cost of research work in agriculture makes it highly desirable that the Association of Land-Grant Colleges should again express itself as definitely in favor of a still closer correlation of research between the respective States and the Federal government. We recognize the primary obligation that rests upon the Federal government to undertake a study of those problems of international importance, as well as those that are national or regional in character. We believe that the States should concern themselves especially with the local needs of their respective commonwealths. There exists, however, a zone of effort between these two well marked extremes that should constantly be the subject of careful consideration as to whether the objects of agricultural science could not be better subserved by joint action of the Federal and State forces. Such problems often require a consideration of fundamental studies that extend far beyond the resources of most individual State stations. The results that may be reached are often of more or less universal application. We recognize, however, that research in its last analysis depends so much on the attitude of the personnel concerned that no positive rules can be laid down to guide in selecting the best course to follow in any particular case.

Now that a Director of Scientific Work has been established in the Federal Department, to whom has been committed the special consideration of these problems, we believe that specific attention should be called to the great desirability of station directors consulting with the Federal authorities in matters of inaugurating research that is of such a character that the higher interests of science and efficiency would be met. We also feel that a reciprocal attitude of this character on the part of the Federal organization will greatly strengthen the position of agricultural science in the national economy. An expression of the reciprocal value of such relations only serves to strengthen the bonds that already exist, but which may be given more emphasis by these recommendations.

We commend especially those examples of joint action represented by such cooperative enterprises as the barberry eradication, rusts of wheat, root rots of cereals, soft pork investigations, soil survey, cost of production studies, and the present plans for the organization of commodity councils and other similar cooperative projects.

F. B. MUMFORD,  
H. L. RUSSELL,  
E. W. ALLEN,  
ALFRED ATKINSON,  
MILTON WHITNEY,  
W. A. TAYLOR,  
J. R. MOHLER,

*Committee.*

On motion, the report was received.

The report of the Committee on Publication of Research was submitted on behalf of the committee by its chairman, J. G. Lipman, Director of the New Jersey Experiment Stations, as follows:

#### REPORT OF THE COMMITTEE ON PUBLICATION OF RESEARCH

The publication of the Journal of Agricultural Research was suspended on December 1, 1921. This was done by the authority of an act of Congress terminating the publication of certain periodicals heretofore issued by the departments of the government. Representations were made by the Executive Committee of the Association of Land-Grant Colleges and by others to the Secretary of Agriculture and to committees of the Congress. It was pointed out that the discontinuing of the publication of the Journal of Agricultural Research would be inimical to the interests of research, both in the Department of Agriculture and in the experiment stations. The members of Congress to whom the matter was presented were sympathetic and were anxious to do everything they could to relieve the situation. Finally, the Secretary was able to authorize the establishment of the Journal under Senate Joint Resolution 132, which reads as follows:

"SEC. 3. That the head of any executive department, independent office, or establishment of the Government is hereby authorized, with the approval of the Director of the Bureau of the Budget, to use from the appropriations available for printing and binding such sums as may be necessary for the printing of journals, magazines, periodicals, and similar publications as he shall certify to be necessary to conduct the ordinary and routine business of such department, office or establishment."

Because of this authorization the publication of the Journal was finally approved by the Bureau of the Budget on October 19. The manuscripts that have accumulated meanwhile will be forwarded to the Government Printing Office as fast as may be expedient and the first number of the new volume is scheduled to appear on January 6, 1923. The members of the committee wish to acknowledge a debt of gratitude to Secretary Wallace, to the members of the Executive Committee of the association and to the members of Congress for their loyal support of the editorial board of the Journal. During the fiscal year ending June 30, 1922, there were submitted for publication in the Journal a total of 64 papers. Twenty-six of these originated in the experiment stations and 38 in the Department of Agriculture. A list of the papers published during the period July 1, 1912 to November 26, 1921, is herewith submitted. For obvious reasons the titles of the papers whose publication is pending are not being given.

Respectfully submitted,

J. G. LIPMAN,  
R. L. WATTS,  
W. A. RILEY,  
*Committee.*



### Department

#### Bureau of Animal Industry:

- A Constant-Temperature Bath for Heating Blood Serum, by R. R. Henley.
- A Souring of Beef Caused by *Bacillus megatherium*, by Hubert Bunyea.
- Sandy Crystals in Ice Cream: Their Separation and Identification, by Harper F. Zoller and Owen E. Williams.
- Hemotoxins from Parasitic Worms, by Benjamin Schwartz.

#### Bureau of Entomology:

- Distinguishing Characters of the Larval Stages of the Ox-Warbles, *Hypoderma bovis* and *Hypoderma lineatum*, by E. W. Laake.
- A Biological Study of the Red Date-Palm Scale, *Phoenicococcus marlatti*, by Arthur D. Borden.
- Red Date-Palm Scale, *Phoenicococcus marlatti*: A Technical Description, by Harold Morrison.
- Dispersion of Flies by Flight, by F. C. Bishopp and E. W. Laake.
- Solenopotes capillatus*, a Sucking Louse of Cattle Not Heretofore Known in the United States, by F. C. Bishopp.
- Hopkins Host-Selection Principle as Related to Certain Cerambycid Beetles, by F. C. Craighead.
- Biology of *Embaphion muricatum*, by J. S. Wade and Adam H. Boving.

#### Bureau of Plant Industry:

- Relation of Horse Nettle (*Solanum carolinense*) to Leafspot of Tomato (*Septoria lycopersici*) by Fred J. Pritchard and W. S. Porte.
- Reduction in the Strength of the Mercuric-Chlorid Solution Used for Disinfecting Sweet Potatoes, by J. L. Weimer.
- Catalase, Hydrogen-Ion Concentration, and Growth in the Potato-Wart Disease, by Freeman Weiss and R. B. Harvey.
- Effect of Crown Gall Inoculations on *Bryophyllum*, by Erwin F. Smith.
- Effect of the Length of Day on Seedlings of Alfalfa Varieties and the Possibility of Utilizing This as a Practical Means of Identification, by R. A. Oakley and H. L. Westover.
- Studies in the Physiology of Parasitism with Special Reference to the Secretion of Pectinase by *Rhizopus tritici*, by L. L. Harter and J. L. Weimer.
- Respiration and Carbohydrate Changes Produced in Sweet Potatoes by *Thizopus tritici*, by J. L. Weimer and L. L. Harter.
- Wound-Cork Formation in the Sweet Potato, by J. L. Weimer and L. L. Harter.
- Two Sclerotium Diseases of Rice, by W. H. Tisdale.
- Occurrence of Quercetin in Emerson's Brown-Husked Type of Maize, by Charles E. Sando and H. H. Bartlett.
- Effect of Soil Temperature upon the Development of Nodules on the Roots of Certain Legumes, by Fred Reuel Jones and W. B. Tisdale.

- Blackleg Potato Tuber-Rot under Irrigation, by M. Shapovalov and H. A. Edson.
- Aecial Stage of the Orange Leafrust of Wheat, *Puccinia triticina* Eriks., by H. S. Jackson and E. B. Mains.
- A Transmissible Mosaic Disease of Chinese Cabbage, Mustard, and Turnip, by E. S. Schultz.
- Notes on the Organic Acids of *Pyrus coronaria*, *Rhus glabra*, and *Acer saccharum*, by Charles E. Sando and H. H. Westover.
- Relation of Soil Temperature and Other Factors to Onion Smut Infection, by J. C. Walker and L. R. Jones.
- A Physiological Study of Grapefruit Ripening and Storage, by Lon A. Hawkins.
- Genetic Behavior of the Spelt Form in Crosses between *Triticum spelta* and *Triticum sativum*, by Clyde E. Leighty and Sarkis Boshnakian.
- Plum Blotch, a Disease of the Japanese Plum, Caused by *Phyllosticta congesta* Heald and Wolf, by John W. Roberts.
- A Comparison of the Pectinase Produced by Different Species of *Rhizopus*, by L. L. Harter, and J. L. Weimer.
- Ash Content of the Awn, Rachis, Palea, and Kernel of Barley during Growth and Maturation, by Harry V. Harlan and Merritt N. Pope.
- Temperature Relations of Stone Fruit Fungi, by Charles Brooks and J. S. Cooley.
- Transportation Rots of Stone Fruits as Influenced by Orchard Spraying, by Charles Brooks and D. F. Fisher.
- Susceptibility of the Different Varieties of Sweet Potatoes to Decay by *Rhizopus nigricans* and *Rhizopus tritici*, by L. L. Harter and J. L. Weimer.
- Bureau of Chemistry:
- Flora of Corn Meal, by Charles Thom and Edwin LeFevre.
- Absorption of Copper from the Soil by Potato Plants, by F. C. Cook.
- Forest Service:
- Influence of the Period of Transplanting Western White Pine Seedlings upon Their Behavior in Nursery and Plantation, by E. C. Rogers.
- Storage of Coniferous Tree Seed, by C. R. Tillotson.
- States Relations Service:
- Assimilation of Nitrogen, Phosphorus, and Potassium by Corn When Nutrient Salts Are Confined to Different Roots, by P. L. Gile and J. O. Carrero.

#### State Experiment Stations

##### Arkansas:

- Biological Analysis of the Seed of the Georgia Velvet Bean, *Stizolobium deeringianum*, by Barnett Sure and J. W. Read.

##### California:

- Correlation and Growth in the Branches of Young Pear Trees, by H. S. Reed.

**Illinois:**

Fertility in Shropshire Sheep, by Elmer Roberts.

**Indiana:**

Turnip Mosaic, by Max W. Gardner and James B. Kendrick.

Soybean Mosaic, by Max W. Gardner and James B. Kendrick.

**Kansas:**

Hydrocyanic Acid in Sudan Grass, by C. O. Swanson.

Relation of Hardness and Other Factors to Protein Content of Wheat,  
by Herbert F. Roberts.

Study of the Relation of the Length of Kernel to the Yield of Corn,  
(*Zea mays indentata*), by C. C. Cunningham.

**Maryland:**

Reliability of the Nail Test for Predicting the Chemical Composition of  
Green Sweetcorn, by Charles O. Appleman.

**Minnesota:**

Further Experiments in Field Technic in Plot Tests, by A. C. Army.  
Comparative Vigor of F<sub>1</sub> Wheat Crosses and Their Parents, by Fred  
Griffie.

**Missouri:**

Influence of the Plane of Nutrition on the Maintenance Requirement  
of Cattle, by F. B. Mumford, A. G. Hogan, and W. D. Salmon.

**Montana:**

Pale Western Cutworm (*Porosagrotis orthogonia* Morr.), by J. R.  
Parker, A. L. Strand, and H. L. Seamans.

**Nebraska:**

Nutrient Requirements of Growing Chicks: Nutritive Deficiencies of  
Corn, by F. E. Mussehl, J. W. Calvin, D. L. Halbersleben, and  
R. M. Sandstedt.

Temperature and Humidity Studies of Some Fusaria Rots of the  
Irish Potato, by R. W. Goss.

**Nevada:**

Some Observations Regarding Eosinophiles, by Lewis H. Wright.

**New Jersey:**

Effects of Some Cucurbita Seeds on Animal Metabolism, by Benjamin  
Masurovsky.

Effect of Ammonium Sulphate upon Plants in Nutrient Solutions Sup-  
plied with Ferric Phosphate and Ferrous Sulphate as Sources of  
Ions, by Linus H. Jones, and John W. Shive.

**New York:**

Microscopic Study of Bacteria in Cheese, by G. J. Hucker.

**North Dakota:**

Rate of Culm Formation in *Bromus inermis*, by L. R. Waldron.

**Ohio:**

A Fungus Disease Suppressing Expression of Awns in a Wheat-Spelt Hybrid, by Lloyd E. Thatcher.

**Oregon:**

Transmission of Some Wilt Diseases in Seed Potatoes, by M. B. McKay.  
Further Studies on Relation of Sulphates to Plant Growth and Composition, by Harry G. Miller.

**Pennsylvania:**

Bacteriological and Chemical Studies of Different Kinds of Silage, by Charles A. Hunter.

**Utah:**

A Dryrot Canker of Sugar Beets, by B. L. Richards.

On motion, the report was received.

**ELECTION OF OFFICERS**

The following were elected officers of the Sub-section of Experiment Station Work: Chairman, W. R. Dodson, Director Louisiana Experiment Station; secretary, J. W. Wilson, Director South Dakota Experiment Station.

**COMMITTEE ON THE PURNELL BILL**

After considerable discussion it was moved, seconded, and voted:

That the chairman of the division, Director Dodson, appoint a committee of five, of which number at least one shall be a member of the Executive Committee, and of which the chairman himself shall be a member, to further the passage of the Purnell Bill; the said committee to organize as it desires.

**WEDNESDAY MORNING, NOVEMBER 22, 1922**

This was a joint session of the various sub-sections of the Section of Agriculture for the discussion of matters pertaining to research, and was presided over by B. W. Kilgore, chairman of the Section of Agriculture.

The following paper was presented by S. B. Haskell, Director of Massachusetts Experiment Station:

**THE ENVIRONMENT OF THE RESEARCH WORKER,  
A HUMAN PROBLEM IN STATION ADMINISTRATION**

**BY S. B. HASKELL**

A man's success in research work is governed by three dominant influences: By his inherited abilities; by his training; and by the environment in which he carries on his work. The first and third of these factors are the more important. The training which may be given to potential research workers can be of no avail unless, in the first instance, there be something on which to build; and, in the second, an environment produced in which the worker may make good use of his natural and acquired abili-

ties. Therefore, from the standpoints of both the employing administrative officer and the research worker himself, this influence of environment on the quality and quantity of research work warrants extended discussion.

In many different ways may we analyze the influence of environment on the output of the several research branches of our agricultural institutions. We may measure the effect of home conditions, of salary scale, of children in the family, and of personal and professional jealousy. The fact of friction with so-called superior officers is oftentimes a factor which may not be safely ignored; and we must at least attempt to estimate the effect of those increasingly numerous rules and regulations which serve to circumscribe the worker. The effect of dissipation of energy through participation in many activities is also a vital question, which in some institutions is conspicuously in the foreground. Always must the research service of the institution be so ordered as to obtain and retain a measure of public support, and the resultant effect on the character of research output should be a matter of continual study. Many other aspects of the problem will suggest themselves. For this discussion, however, it seems sufficient to recognize three main sub-divisions: First, that of the influence of social conditions on the development of the concept of agricultural research; second, the effect of the scientific atmosphere, so-called, on service rendered through agricultural research; and last and most important, the need of agricultural contacts. Before I discuss these, however, I must define as clearly as possible my own concept of the research function of our agricultural colleges and experiment stations.

#### THE KEY-NOTE: PUBLIC SERVICE, THROUGH SERVICE TO AGRICULTURE

To perform in an organized way that research which farmers, unorganized, working as individuals, can not perform for themselves, is the function of our agricultural experiment stations. The justification of the expenditure of public funds for the service of what is apparently a single industry is found in the fact that the benefit of any betterment in method, or of any improvement in the plant or animal materials with which a farmer works, goes ultimately to the public rather than to the farming industry. Locally, it is true, farmers may and do profit through improvement in practice; but finally, after the improvement becomes a part of regular practice, production becomes greater, prices move to lower levels, and the public reaps its dividends from investment in agricultural research. The real service of the experiment stations is, therefore, to the public. In increasing measure the stations must serve as advocates of the interests of the general public, but only through caring for the interests of the agricultural industry. The key-note of our research organization, therefore, must be service to the public, through service to agriculture.

Now agriculture is both a means of earning a livelihood and, also, a mode of living. Our research service must consider the human side of the problem, as well as the mere industrial or commercial side. Research workers must understand and sympathize with those who elect to follow agriculture as a mode of living. To the men and women on the farm, a crop failure may mean disaster in life. Inability to control insect pests or plant diseases may be nothing short of tragedy. Deflation as an economic process may mean the loss of the savings of years, and may render it

impossible for the farmer to continue sending his children even to the secondary school, let alone the college and university. To the men and women on the farm, problems of precedence of publication, of professional jealousy, of professional courtesy and ethics, of priority of work—all of these things mean nothing, for these people are facing in their every-day life the stark problems of existence. Their livelihood may be endangered by the difficulties which, to us of the experiment stations and agricultural colleges, may be nothing more than problems for investigation. This is the environment of the people on the land, of those who should be, and in many cases are, the main clientele of our agricultural colleges and experiment stations.

#### THE SOCIAL ENVIRONMENT OF THE UNIVERSITY CITY

By way of contrast, let us for a moment compare these conditions with those found in the typical university town or city in which most of our agricultural research workers live and find their work. A university city is a delightful place in which to live. It is peopled with delightful persons with whom to live. Nearly every one is on salary, sufficient, generally, to provide for fairly easy existence, and for most of the comforts and many of the luxuries of this day and generation. The somewhat arbitrary and always artificial social standards of the university town are far removed from those of the countryside. The social conventions occupy a prominent place in the routine of daily life. The perspective of salaried men living in this environment differs widely from that of those who must annually earn their bread by the sweat of their brows, and who in so doing must risk frost and flood, drouth, and disease, deficiencies in labor and decline in markets. May we not say that the success of our research work in agriculture has been attained in spite of a somewhat enervating social environment, which could but tend to draw men away from actual contact with the men and industry which they were supposed to serve?

#### THE "SCIENTIFIC ATMOSPHERE" AN ESSENTIAL AID TO AGRICULTURAL RESEARCH

If the social environment of our agricultural colleges and experiment stations be unfavorable to intensive research work, it may also be said that the academic or scientific environment may be unfavorable to research work in agriculture. Whether the ideal of pursuit of knowledge for itself alone is actually incompatible with the ideal of the pursuit of knowledge for the sake of the service which it may render, is something on which I can not pass. I do know that one effect of the carrying on of agricultural research work in a so-called "scientific atmosphere" has been to strengthen it enormously, and to place it on a much more solid foundation. The big advance in agricultural research during the past thirty years has been chiefly along the line of bringing science to the aid of agriculture. Yet notwithstanding this tribute, which I am glad to be able to pay to the men of the pure sciences and the cause which they represent, there is another aspect of the problem which is not so favorable to the cause of progressive and productive research in agriculture. Some of our research workers in agriculture are disinclined to allow of their work being defined in terms of service expected. Many times have I had it explained to me that inability to define the objective of a project is no indication that it will fail to be

of service—which fact is undeniably true. Many times have I had illustrated in detail the fact that in true research work no one can really know what the results will be; and that no one, specifically no station director, is really competent to judge as to possibilities. All of this I must admit; and yet I present these instances as support of my contention that too frequent and long-continued steeping in the atmosphere of pure science, unless counterbalanced through exposure to an agricultural environment, causes the research workers of our agricultural colleges to forget the high ideals of service which brought these institutions into being, and to wander far afield in their search after knowledge.

I can bring many other illustrations to the support of the same contention. The prime market for many of our experiment station bulletins has ceased to be the farmer. Of course, I am familiar with the conditions which have brought this about. A little later I shall indicate a few of these. Yet I believe it to be poor policy to relieve our research men in agriculture from the necessity of reporting to their main clientele, the farmers of their State, on the work which they are doing. I am reminded of a little anecdote of Louis Agassiz, reported in a recent issue of *Science*. It is said that with the graduate students in his laboratory, the first problem given to a budding naturalist was that of the preparation of a scientific monograph. This completed to the satisfaction of a most exacting master, the next problem, in the order of increasing difficulty, was the preparation of a popular lecture on the same subject. Finally, to those students who successfully passed both the first and second tests, was given the most difficult problem of all, that of the preparation of a child's story on the subject matter under investigation. Therefore, do we not lose a most valuable means of attaining contact between agriculture and agricultural research when we relieve our research men of the necessity of presenting to farmers an accounting of their work, expressed and described in language which the audience can understand?

I have thought that the motive of winning the plaudits of their scientific colleagues has appealed to some of our station workers in greater degree than that of real service to the people of the country, through its agricultural industry. Many times has there been failure to bring our research work to conclusion in a business-like way, which failure could be explained only on the basis of a lack of an intimate contact with the problems of the industry being served. Too often, I suspect, the principles of academic freedom and professional courtesy are allowed to stand in the way of real service to agriculture. Some of our workers fail to recognize that, although there may be no time limit on science, there is such a limit on human life; and that what we fail to accomplish in this world as individuals, we may hardly expect to accomplish in the next world in the form of disembodied spirits.

#### PROFIT AND LOSS STUDIES AN ESSENTIAL PART OF RESEARCH WORK

I have often heard expressed the fear that agricultural research work will be commercialized. Typically this fear is expressed by men of the pure sciences rather than by men actually engaged in research for agriculture. The former forget that agriculture must be a success as a commercial industry in order that it may furnish to its participants a satisfy-

ing mode of living. They do not realize that commerce is simply a tool for the accomplishment of certain objectives of human relationship; and that the profit and loss phase of commercial life simply serves as a measure by which people decide whether or not it be worth their while to continue certain lines of activity. Identically the same decisions must be made daily in the laboratory as are made in the commercial and agricultural life of the country. Any research worker who is not constantly asking himself as to the correctness of his line of attack is hardly worthy of the name. Has the attack which he is planning any chance of succeeding? May the time which he is spending be better used on a different problem? The answer to both questions is expressed in terms of relative profitableness of time expenditures—and time rather than money is, after all, the ultimate unit of cost. Fundamentally, therefore, our research workers deal in terms of profit and loss. It is to be regretted that some of them fail to realize that the results of their work, viewed in the general scheme of research work for agriculture, must also be exposed to the same measure; and that rigid analysis in this respect presupposes no disrespect for science, nor yet lack of faith in the service of science to agriculture. There are always many ways in which time and money may be spent; and it is the duty of the station director to evaluate the projects which may come to him in terms of those which promise the best service to agriculture.

Please do not consider this an arraignment of our research workers in the pure sciences; nor yet a criticism of what we sometimes call the "scientific atmosphere." Such an atmosphere is invaluable to research work, a prime necessity; but it must be tempered by actual contact with the agricultural environment.

#### THE NEED OF AGRICULTURAL CONTACT

I believe that much of the current feeling that our stations are not supported as earnestly or as vigorously as we feel they deserve goes back to the non-agricultural environment to which many of our research men are exposed. The danger is most serious in those places where our workers are in fact removed from contact with those whom they are employed to serve. In times past, before the development of the extension service, they had this contact. Failure to preserve points of contact may be and probably is simply one place in which the stations are not yet adjusted to the changed organization in our agricultural colleges.

In the old days experiment station men were called upon for all kinds of service. They participated very largely in the old-fashioned farmers' institutes. They went out on to the land, they attended farmers' meetings, they stayed overnight at farmers' homes. In their offices, desks were often littered with letters which came from farmers, calling for service and information of widely varied scope, but without bringing our men of science into actual contact with the men of the farm. Time-consuming to a degree was all this. It certainly had a great effect on the quality of research, and in case a man was at all successful in his correspondence work, this fact served absolutely to prevent any degree of efficiency in research itself. Yet, it kept the fingers of our research men on the pulse of the agricultural industry. There was then actual contact between the investigators and the farmers, and real sympathy based on knowledge and understanding on



the part of the station men. Somehow I can not be reconciled to any plan of organization which loses to the station this enormously valuable contact.

Under our present plan of organization, there are usually three main divisions to each department, one giving service in an extension way, another caring for resident teaching, and the third giving its time to research. All of us must admit that this division allows our research men to concentrate on their problems and should result in much better research work being done than has ever before been possible. There is, however, an open question as to whether it be at all possible to make our agricultural research really serve its purpose, in case contact with agriculture must be obtained vicariously through the extension service. This, therefore, is to my mind the real and vital problem of environmental influence. It has not yet been solved.

#### THE ULTRA-PRACTICAL ENVIRONMENT OF THE SUB-STATION

Of all the organizations through which research work for agriculture is being carried on, the sub-stations maintain the closest contact with the agricultural interests which they serve. They are usually modest affairs, designed to serve either a particular soil area, or a highly specialized branch of the agricultural industry. The officers in charge are exposed to an environment of practice rather than of science. If the atmosphere of the university is ultra-scientific, then that of the sub-station is ultra-practical. The workers of the sub-station live with farmers. They become one of them, and take the farmers' problems as their own. The tendency is to develop work which may be seen and appreciated by the farmer clientele, much the same as it is the unconscious tendency for the men of the home stations to work for the praise of their scientific colleagues. The fact of success in a research of immediate practical value brings to the individual concerned so many calls and demands for assistance, that he is no longer able to concentrate on his problem. Like the bacterial organism which produces certain substances which inhibit further growth of the causal agency, so success in research automatically prevents the successful investigator from continuing his work. If the sub-station develops without benefit of contact with science and with men of science, in process of time it becomes a mere testing and demonstration plant; and its men, instead of giving their time and energy to real investigation, engage in an enthusiastic, but inefficient and unorganized, kind of personal-service extension work.

Precisely this development has occurred a number of times. It is taking place today. I believe that the best and most productive agricultural research is being done in the scientific atmosphere of the home station; but seldom does this home station have the vigorous and enthusiastic support which is given by the farming public to the work of the sub-stations. This fact, therefore, brings out in high relief the vital necessity of exposing our research men, of all grades and all professions, and of all affiliations, to the tempering effect of real contact with agriculture, in order that our research work may be rightly directed, yet not suffer through lack of appreciation of scientific methods and scientific standards.

How may this be brought about? How may real contact be secured? Is it possible to obtain this without sacrifice of standards?

# IS IT POSSIBLE TO PRODUCE AN AGRICULTURAL ATMOSPHERE IN AN ACADEMIC ENVIRONMENT?

Whatever I say in this connection must be with great diffidence. The very fact of inexperience in research administration may enable me to see and define a difficulty, without at the same time enabling me to point out the remedy. Therefore, I must content myself with a very few general statements.

I am inclined to raise question as to departmental organization in its relationship to research work. Botany, chemistry, entomology, geology, in fact all of the natural sciences, have no place in an agricultural experiment station other than as tools for research. The end point is the service which these tools may render, rather than the interests of the science itself. This view-point focusses attention on agriculture rather than on science.

I believe that some help will come from a more careful and systematic classification of investigational projects. There are really three great types of so-called experimental work. First is that in which something is done merely for the sake of seeing what will happen. In extreme cases we may continue doing this thing for years without number—just for the sake of seeing what will happen. This is the common or garden type of experimentation, but it appeals to farmers immensely—also to county agricultural agents.

The second is that which contents itself with the mere amassing of data. Some of our field experiments are of this type, likewise a great deal of the survey work which is being done in farm management and in agricultural economics. The estimation in which this type of work is viewed by some is well portrayed by the somewhat caustic, if not captious, criticism of a friend of mine, a brother station director, who said, "If you must do something quickly, if you know you must do something quickly, and know that others know that you must, make a survey." A survey is indeed a fine thing on which to "get by." It is to be recommended to the undergraduates of our agricultural colleges, likewise to some of our graduate students. In reality, however, it is a means to an end, and as such abundantly justifiable and not worthy of the critical attitude above portrayed.

The third and last type of agricultural research, and by far the most difficult, is that which defines its objective in terms of service needed, and which concerns itself with ways and means of attaining this objective. As time goes on we may expect more of our projects to classify in this group. Right here is where contact with agriculture may be enforced, through the requirement of a survey study to insure that the problem presented is real, and that the results will warrant the time and money expenditure contemplated.

Finally, with reference to the correlation of the work of the sub-station with that of the home station, I have often thought it a mistake to assign permanent workers, other than the crop specialist in charge, to sub-station service. May it not be better to assign the scientific assistants on project, either for the life of the project or for a specified number of months or years, and bring them back from the field to the service of the home station when the time is up? Such a practice will improve the work of the sub-station by bringing to its aid men fresh from a scientific environment; it will likewise improve greatly the work of the home station by

bringing to its service actual contact with field problems. Of course it may be somewhat hard on the man involved, but we must always remember in this connection that farming is in itself a hard life. It will do no harm for some of our men occasionally to get away from the atmosphere of the university town, in order that they may see certain things in their true perspective.

But it is my function today to present the picture as I see it, rather than to point out remedies. Possibly, indeed, the difficulty is inherent—in which case ceaseless agitation is the only remedy. Therefore, let me summarize. Our scientific men, research workers in agriculture, immured within an academic institution, lose touch with their clientele, forget the necessity of service to agriculture, and tend toward the pursuit of knowledge for itself alone. Other men, working in the field, become steeped in the atmosphere of practice, and cease to bring to agriculture the services of real science. Somehow, somewhere, must we bring the former group into contact with the vital problems of agriculture, and the latter into renewed contact with the standards of the pure sciences, in order that we may continue to use these sciences as efficient tools in the pursuit of agricultural research—research for the public benefit, through the medium of the agricultural industry.

#### DISCUSSION OF DIRECTOR HASKELL'S PAPER

T. P. COOPER, Director Kentucky Experiment Station. Drummond's "Essay on Environment" states that "heredity and environment are the master influences of the organic world," and that "environment is really an unappropriated part of ourselves." Hence, a discussion of the influences of the environment of research involves the consideration of the more or less intangible factors that have to do with a man's development and his adjustment to his surroundings. The use of the term "environment" in this discussion deals largely with the influences that are more or less under the control of the individuals or of the groups of individuals. A favorable or unfavorable environment is felt rather than analyzed or measured. Probably if called upon to describe an environment favorable to research it would be found that the definition would vary with the individual. Much of the environment is largely that of congenial relationships, supplies and materials, favorable working conditions, encouragement and such various intangible influences as affect the viewpoint and ability to develop work of quality.

Director Haskell has discussed very interestingly a subject that appeals to every individual engaged in research work and is constantly under consideration by those charged with the administration of funds and accountable for the returns that may be obtained from this expenditure. His grouping of the important factors in environment, namely social, scientific, and agricultural contacts, appears logical so far as it covers the conditions that are to a degree under the control of the individual or institution. The general viewpoint as developed undoubtedly applies to the greater number of our institutions. Judging by the Central Western or Western institutions, it appears that the difficulty of maintaining the agricultural contacts and its possible effects, as described in the last paragraph of the paper, are not as pressing as indicated. Unquestionably during the

past few years there may have been a tendency to neglect at times the objective of a direct or indirect application of a particular problem to agriculture. At times there has been a tendency to decry the so-called practical type of investigation and to place projects upon a basis that did not bear upon agricultural problems. However, it is unlikely that this tendency represents any large percentage of the group engaged in agricultural research, for at the present time it is a safe generalization that the majority of research workers are dominated by the motive of service to agriculture.

The training of many of the men now leaders in research and departmental heads has been under conditions of meager equipment and limited funds. They were farm-reared and their contacts with farmers are comparatively numerous. One can not read over the list of projects in experiment station work without being impressed with the fact that their objective is uniformly that of meeting agricultural problems that are either pressing or upon the immediate horizon.

If productive investigation depends upon training and an attitude of mind, opportunity for thought, favorable working conditions and equipment, then it is important to provide these conditions so far as is reasonable. It has been proved time and again in industrial surveys that conditions under which men work have much to do with the quality and quantity of the output. There is every reason to believe also that environment has a considerable effect on the output of men when engaged in research.

#### ENVIRONMENT FAVORABLE TO RESEARCH

It has become customary to consider the favorableness of environment in terms of apparatus, equipment, supplies, abundance of assistance and leisure for the worker, freedom from the perplexities of gaining a living and from the distractions of other fields of work.

Certain influences seem favorable to research in agriculture: (a) A continuing farm experience that will enable the worker to comprehend problems in his field; (b) a reasonable opportunity to follow a line of investigation; (c) freedom to a large degree from the calls for other work; (d) contact with other scientific thought. One may enumerate additional influences that may be favorable to productive investigations, such as home conditions, salary, professional relationships and that group of material comforts that make the path of research easier or, in their absence, much more difficult.

The tendency within the experiment stations located in connection with our great universities is undoubtedly to bring about a condition of living and an environment that is far removed from the conditions that surround the farm. There is no reason why it should be otherwise. The farm atmosphere may not be conducive to research or the fine technique that will help solve agricultural problems. However, if the environment of the farm could to an extent become that of the research worker, through his experiences and sympathies, he would have a clearer perspective of many of the problems that require work and a more definite objective directly or indirectly to those problems.

## INVESTIGATOR DETERMINES RESEARCH PRODUCT

In a discussion upon the effect of environment, the importance of the individual investigator in determining what his product shall be can not be overlooked. While one would not wish to minimize the importance of a so-called proper environment, yet a consideration of the environments of many of the productive workers in research indicates that many of the conditions that are presumed to be particularly favorable have contributed but little.

All know of the many classic examples of the highest type of research that have been performed under conditions that have been far from ideal. As we study the developments of invention and research that have had a profound influence upon our industries we find that the determining factor has been the ability and industry of the man rather than his response to the conditions that surround him. A Thomas Edison performs research of the highest value to human kind, yet for many months he lacks appliances, apparatus, equipment, and laboratories. A Goodyear starves in a garret, but develops the basis of a new industry for the world. Madame Curie and her husband spend seven years in a meager laboratory and are denied many of the necessities of life, yet accomplish one of the important pieces of research of the age. Similarly we may cite many examples in the agricultural field. Much of the research, at least of the past years, that has had the greatest effect on agriculture has been developed by men whose environment has been that of hardship, poverty, and lack of equipment. This environment was not especially favorable for research. Illustrations of this are numerous and may be cited from the experiences of most experiment stations. The early work in the dairy industry, the working out of the scientific principles of butter and cheese making; the change taking place in silage and the place of silage in feeding; all were matters of fundamental importance. Dr. Burrill's discovery of the cause of pear blight, the first demonstrated bacterial disease of plants; the discovery of the use of kerosene emulsion in the combating of insect pests; Dr. Arthur's monumental contribution to the knowledge of rusts; the premier work of Dr. Hilgard in soils; Dr. Armsby's investigations in animal nutrition; the effect of acidity upon soil fertility; these are a few examples of the achievement in research under conditions that were not especially favorable. The early work of the Rothamsted Experimental Station was under relatively crude conditions, yet the results have stood the test of time and furnished the experiment stations of today with methods and ideals. The investigator of genius, initiative, and ability fired with an ambition for accomplishment and stirred by the opportunity for service creates in a sense his own environment.

An agricultural background and the ability to meet and conquer obstacles is characteristic of many of our successful investigators. This leads to the query: In addition to endeavoring to supply those conditions within an institution that favor productive research, should not the emphasis be placed upon the type of farm experiences of the man who is selected for productive research in agriculture?

## CONTACT WITH AGRICULTURE

Director Haskell has pointed out the need of agricultural contact and the loss that may occur to agricultural research if workers are not exposed to the practical. Possibly this particular condition of environment has a greater effect upon the output of essential research in an experiment station than any other one factor. Agricultural research is performed to meet an agricultural need, either immediate or prospective. Unless a relationship is maintained with farmers and with farm conditions, few workers in research will correctly see the problem or its possibilities. It is not necessary that a man shall have contact with the mass of farmers, but he must have the opportunity of coming in contact with the inquiring minds of men who have thought sufficiently about their work and problems to be able to suggest subjects for fruitful research. A few such are found in every State. A fertile opportunity for the development of such inquiry rests with the visitor to the experiment station who may meet a research worker in his laboratory, in the experiment field or in the barn, and, through his discussions, point to a field of research for which there is urgent need. A large volume of research is undoubtedly due to this contact with the inquiring mind of some farmer. Originally, the farmers' institutes and farmers' meetings were an important means of contact for the research worker in agriculture. This was particularly true so long as the question was one largely of trial, of comparison, and of practice. As agriculture has progressed, new problems develop that require research ability of the highest order. The practical bearing of the projects that may be undertaken come through the practical agricultural knowledge of the research worker or the stimulation that he may receive through contact with the thought of men who are on the farm. The experiment station must provide a method by which the young investigator may make and maintain these contacts.

## INFLUENCES OF ADMINISTRATION

Administrative officers have a direct relationship to productive research. To an extent, administration, especially that of the department head, is a part of the environment of the research worker. The rôle of the executive dealing with men is more or less difficult as he attempts to focus work upon certain objectives, maintain the professional relationships between workers that will further progress upon a project, eliminate the causes of friction or adjust differences of thought and method. Temperament in individuals engaged in scientific study may be as pronounced as that of the opera star. The good will and happiness of workers within the institution brought about through the executive officer is one of the essentials in the environment that is favorable to productive research. This duty for the creation of conditions that foster initiative on the part of the average man in research does not rest alone on heads of departments and directors, but extends to the governing boards of institutions.

## CONCLUSION

The influence of environment, as Director Haskell has pointed out, has undoubtedly an effect on the quality and quantity of research. Its application is primarily a question of the maintenance of conditions that make

possible the maximum return from the average man engaged in research. Those of outstanding ability make progress in spite of unfavorable conditions. The price paid for such progress may, however, be much too high. Given men of ability and with the desire of accomplishment within the agricultural field, does not then the problem of a favorable environment become that of a maintenance of a morale that encourages productive research and provides the optimum contacts with those engaged in agriculture? It may be that the question of method of organization is of less importance than a willingness and desire upon the part of the worker to test frequently his project through the friendly eyes of the progressive farmer, rather than to depend upon the standards that may be set by groups unconnected with the great and vital industry of agriculture.

Again quoting Drummond, "The great function of environment is not to modify but to sustain." If this view be accepted, we find that the question of a favorable environment for research becomes that of surrounding the productive type of worker with the influences that build up and maintain the ability of the man. It matters not whether this is the rarefied atmosphere of pure science or the pressing need of the farmer of today. Each has its place, depending upon the end to be attained.

A. C. TRUE, United States Department of Agriculture. The only thing that occurs to me to say now is that it is doubtful whether we make sufficient distinction between the different kinds of experiment station work in relation to the desirability of station investigators having farm experience and contacts. For example, take the work that Dr. Armsby did on animal nutrition. It is difficult for me to see that the particular things on which he worked would have been influenced particularly by his contact with the farmer. They were essentially scientific problems of nutrition or physiology, and while they had an ultimate effect in their relation to agricultural practice, yet the character and method of research on problems of that kind must be essentially scientific and without particular regard to the practices of the industry. On the other hand, there is a large class of problems in station work regarding which it is very important that the practices of the farm should be taken into account by the investigators.

The following paper was presented by F. B. Mumford, Director Missouri Experiment Station:

#### THE PROBLEM OF RESEARCH IN A COLLEGE OF AGRICULTURE

BY F. B. MUMFORD

All the agricultural experiment stations supported by Federal funds in the United States, with very few exceptions, are organized as divisions of the colleges of agriculture. The problem of research, therefore, in a college of agriculture, is the problem of the agricultural experiment station. It is a problem which demands the serious and thoughtful consideration of every president of a land-grant college, every dean of a college of agriculture, every director of an agricultural experiment station, as well as every scientific worker within the institution. The success and final efficiency of the agricultural experiment station is in a very real sense dependent upon the policies, ideals, and administrative acts of the in-

stitution within which the experiment station is an organic unit. In measuring the educational product of an institution, it is not possible to separate the college teaching activities from those of the agricultural experiment station. The attempt to segregate in whole or in part the experiment station work from the college teaching has not been particularly significant, because a mere physical separation does not necessarily change the fundamental administrative policies which are chiefly responsible for providing the means and influencing the conditions favorable to productive scholarship.

If the administrative officers set a sufficiently high value on scholarly achievements in the form of successful scientific research, the experiment station will prosper. If they do not set a high value on such achievements, mere segregation will not solve the problem. It is true, also, that in a majority of the institutions the highly successful investigators are frequently the most efficient teachers.

The time has come for the colleges of agriculture to recognize the important fact that they are higher institutions of learning, and that as such they must be measured by the same educational ideals, standards of scholarship and productive achievements that apply to other recognized universities and colleges. Whatever justification there may have been in the beginning for the promotion of elementary and superficial instructional courses and for superficial and ill-considered experiment station projects, we have come to a time in the development of these institutions when it must be clearly recognized that the colleges of agriculture of the United States are now institutions of higher learning and as such must apply to themselves the most rigid standards for advanced teaching and fundamental scientific research. The truest measure of successful achievement of a modern college of agriculture must be found in its contributions to knowledge. Productive scholarship is a duty which the colleges of agriculture can not ignore or neglect, if they hope to build permanent institutions and continue to deserve public favor.

The stimulus derived from the teaching of advanced students is a real asset to the experiment station. The investigator who is teaching a small class of advanced students will often accomplish more in the direction of real contributions to knowledge than the same individual would accomplish with no teaching program.

It is assumed, of course, that the teaching duties will not be so exacting that the time and energy of the investigator will be largely consumed in this manner. It is also admitted without argument that giving instruction to underclassmen under any circumstances is not to be regarded as a favorable condition for the best research. The ideal relation of the investigator to college teaching is one in which the researcher has charge of a group of graduate students. Such a relation can not fail to inspire both the investigator and the student.

The ultimate result will be easily measured in an improved morale, greater enthusiasm and zeal, and the development of a spirit of research in the institution, in the absence of which the highest achievements in research are impossible or extremely difficult. One reason why research does not offer a stronger appeal to the intellectually alert and capable graduates of our colleges of agriculture is, that they have not had a sufficient opportunity in their undergraduate course to come in contact with enthusiastic



investigators. The educational ideal apparently embodied in the average curriculum of the college of agriculture is to teach the student something about everything, rather than to teach him everything about something. It is the latter ideal that is essential to the development of research workers. No general-purpose investigators are needed. Dual purpose researchers are even more of an anomaly than are dual purpose cattle.

The college of agriculture must train its own investigators and they must be trained in a regularly organized graduate school or group. The educational problems of the undergraduate school are not the problems of the graduate school. Graduate students can not be trained for research by giving them a few more undergraduate courses. The experiment station demands extreme specialization. It demands of its workers capacity for original thinking, and for original research, and this capacity can not be fully developed except by methods of instruction which are different from the methods which generally prevail in undergraduate instruction.

Successful investigators for agricultural experiment station work can not be satisfactorily trained by extending their knowledge over too many fields of scientific inquiry. It is more important that a graduate student should confine his efforts to a restricted field of knowledge with a view to making real contributions to the major subject. Through such intensive effort a knowledge of the methods of research and skill and experience in interpretation may be developed. Minor subjects should only be permitted for the purpose of illuminating the major problem. The agricultural experiment station, in intimate association with the college teaching in the graduate school, furnishes an exceptional opportunity for developing a high grade of graduate work in connection with the colleges of agriculture. Many institutions have been quick to recognize this fact and have developed exceptionally strong graduate departments.

In practically all the institutions' experiment station workers are also engaged in a certain amount of teaching. The organization, therefore, is already completed for seriously undertaking the training of research workers in the graduate divisions of the land-grant colleges. It may be argued that the time of the investigator should not be consumed in the direction of graduate students, but it is easily possible for the investigator to utilize the projects of the experiment station in the instruction of graduate students in such a way that the student may actually contribute to the success of the investigations and thus become a real asset to the experiment station. In the College of Agriculture of the University of Missouri research scholarships and fellowships have been awarded with highly satisfactory results. The scholars and fellows receive their compensation from experiment station funds and their major problems are problems directly or indirectly related to the experiment station projects. The graduate student thus has the best possible opportunity to relate himself to an active investigational project and to acquire a knowledge of successful methods of research in the shortest possible time. Considered from the viewpoint of the experiment station, the institution really acquires the full time of a graduate student at work on an experiment station project, and it not infrequently happens that a scholar receiving a compensation of \$300 a year develops a piece of research that is more valuable to the experiment station than does a graduate assistant or an instructor whose compensation is five or six times greater.

I hold with Dr. Lipman, who stated before the Sub-section of Resident Teaching in 1921 that a man trained in a college of agriculture, with equal opportunities for graduate study, will undoubtedly accomplish more for agriculture in agricultural research than the men who were trained in institutions in which agriculture has no place.

A better training of research workers is fundamental to a higher type of investigational work in the American experiment station, and this training is not likely to come until the administrative officers, including presidents, deans, and directors, place a higher value upon advanced training than is now the case. Until we are willing to make a professorship in a college of agriculture a prize which may be won only by those of the highest preparation, as well as successful experience, we may not hope for great improvement. There has recently come to the writer's attention a young man, recently graduated from a college of agriculture with the degree of bachelor of science in agriculture, who is directing the work of graduate students who are candidates for the doctor of philosophy degree. It would seem to be self-evident that a man of limited experience who has not himself been trained in graduate work can not be fully qualified to direct others in advanced study. This is particularly true in the case of young men who have recently received an undergraduate degree and who have not had opportunity for advanced study. It is conceivable that a man of large experience and successful achievement in scientific research might direct a group of graduate students, but it is difficult to understand how the inexperienced man, without advanced training, can satisfy the requirements which should obtain in a graduate faculty. In the writer's opinion, there has been a material improvement in the past fifteen years and this improvement has been co-extensive with the progressive development of graduate study to a higher type of fundamental research in institutions where colleges of agriculture are important divisions. If our institutions are to maintain their place among higher institutions of learning, then we must insist upon a higher appreciation of scholarship and must develop among ourselves and our faculties the scholarly point of view. It is certain that we can not safely ignore or neglect an appreciation of those fundamental intellectual values in higher education which have been recognized for generations as essential in the development of colleges and universities.

The measure of the success of an institution of higher learning is in the last analysis to be found in the quality of its college teaching and of its scientific research. This is as true in the subject of agriculture as in the subjects of biology or of history or of mathematics. We must fully recognize this important fact, since it will give direction and purpose to the fundamental policies which control in the development of an institution.

The resources of a college of agriculture available for the promotion of scientific research are material and spiritual. The greatest single asset of an experiment station is obviously the human asset, and next to this is an atmosphere or a pervading spirit of research in the institution.

The colleges of agriculture have been criticised, and I think to some extent the criticism is justified, for measuring the results of their work as educational institutions by the number of great buildings erected, the broad acres added to their domains, the numbers of livestock, the great

laboratories with beautiful equipment, and all the impedimenta which has been so generously provided by a liberal people in the hope that these institutions might finally solve some of the very troublesome and difficult problems which are retarding the development of American agriculture. Such materialistic standards for measuring the results of higher education represent a real danger to the permanent development of the peculiar type of education which we represent. If we are honest with ourselves we must realize that the quality of scientific research of an institution is not necessarily associated with great buildings, great landed estates, beautiful lawns, or magnificent equipment. Indeed, material equipment beyond a certain essential minimum may represent the impedimenta of scientific research. There is no doubt whatever but that the successful careers of many good investigators have been retarded and their productive work materially lessened by imposing upon them the task of administering great appropriations, planning great buildings, or looking after the details of the management of great farms, livestock equipment, et cetera. It would be difficult, in most cases, to discover any improvement in the quality of scientific research in an institution after these great physical improvements have been added to its equipment.

There is great encouragement in all this for the smaller institution. The size of an institution bears no significant relation to the quality of its research. The individual worker in the smaller institution may have a real advantage in that his energies are not dissipated in endless routine. Increased appropriations to experiment stations have apparently not resulted in more intensive research, but are exhibited chiefly in the larger number of projects undertaken. It is not always the large institution that provides most generously either the personnel or the funds and equipment for the individual project.

The observer of the work of the American experiment station can not but be impressed with the amazing industry of the workers in these institutions. If the ills affecting agriculture have not all been cured, it can not be due to the indolence of the experiment station workers. The mass of data now available on every phase of agriculture is impressive. Our stations have developed an exceedingly efficient group of accurate observers. There is great need now for a better interpretation of results. We have not yet fully utilized this great accumulation of scientific fact. We greatly need a few great philosophers like Darwin, who can tell us what we have discovered. I am sure such a philosophical interpretation would prevent a material amount of repetition and would be helpful in directing our attention to the missing links in many partly solved problems.

It is time now for us to engage in severe self-analysis and to recall to our minds the essential and fundamental factors which are prerequisites to the making of real contributions to knowledge and becoming real centers of productive scholarship.

The administrative officers of an institution have not accomplished their full duty when they have secured appropriations from the legislatures and have made up a budget for the year. Administration involves something more than the economics of the institution. The administrative officers can accomplish much through the encouragement of the work of its investigators. The human factor is by far the most important element in determining the success or failure of the agricultural experiment station.

The scientific investigator has often had good reason to feel that administrative officers have placed a higher value upon the winnings of a live-stock judging team or the prizes won by livestock in the great public fairs and expositions, than upon the highly valuable and significant achievements of the investigator. It will always be true that the public will applaud what it can easily understand. The wise administrative officer will not fail to recognize fundamental values and to be quick to praise and fully appreciate the work of the efficient investigator. It is a very serious condition in any institution if there is real cause for the sentiment that productive scholarship resulting from fundamental research is less appreciated than the more spectacular and superficial phases of the college activities.

A development of the spirit of research in an institution is essential to the highest achievements. It is unquestionably true that in certain institutions a spirit of inquiry pervades which influences every man within the institution. The presence of such a spirit in an institution is of immeasurable value. Its conscious development is worthy of the careful consideration of administrative officers. After all, the real compensations which come to the teacher and the investigator are not measured in salary alone. They consist in the consciousness of a great work successfully achieved and of the appreciation of those in a position to greatly influence or definitely control the conditions under which men work.

This paper has had to do chiefly with considerations affecting the individual station. The discussion would not be complete if the writer failed to call attention to the fact that the agricultural experiment stations of the United States are in a sense but units of a single vast organization for scientific research. We will not have fulfilled our implied obligation to the nation if we continue to emphasize our individualistic status. We must learn to cooperate. We must conserve our resources by recognizing the nation-wide application of the efficient work of certain stations. It is not essential that every station solve every problem that pertains to agriculture. We should greatly increase the number of important projects which can be so divided that the work may be parceled out so that a single station may devote its resources to a rather restricted field.

There can be no question but that ten stations, each working on a distinct phase of a big problem, will accomplish immeasurably more than ten station all working on all phases of the same problem.

In conclusion, it is the opinion of the writer that the great agricultural experiment stations of the future will be those that are intimately associated with colleges and universities. The experiment station will recognize as a part of its function the necessity and duty of cooperating with the college and university in the training of the investigators who are to be responsible for the work of the institutions of the future. The success of the agricultural experiment station in such cooperative relation will have a profound influence upon the quality of the educational effort of the college and university with which it is associated. Through such cooperative relation the experiment station will not only have a large staff primarily devoting itself to fundamental research, but will influence the whole university and college staff in the direction of a higher appreciation for research. And finally, if fundamental research languishes in an in-

stitution, it may be and probably is due in large part to a lack of appreciation on the part of the administrative officers.

#### DISCUSSION OF DIRECTOR MUMFORD'S PAPER

E. A. BURNETT, Director Nebraska Experiment Station. The research work of a college of agriculture is built up around the agricultural experiment station. While the organization of these stations has been largely standardized through experience and relation to one central office, the problems of research are still too largely determined by the bias and the training of the individual worker, rather than by their importance and by the resources which can be made available to the agricultural industry.

In determining what type of problems should receive consideration, the station staff must have contact with the farming public, must know the current problems, and must be able to forecast the general trend of the agriculture of the region. This knowledge will enable them to select research projects with discrimination, and to stress those which promise most immediate results, without overlooking the more technical questions which are bound to present themselves in the establishment of a permanent type of agriculture. Occasional surveys of the agricultural field should be made to determine whether the station is already working upon its most essential problems. Such surveys will bring new problems into prominence, determine what lines of work should be stressed and what projects under investigation may be closed and new projects undertaken.

In the selection of research problems the immediate needs of the area served should receive first consideration. Generally these are the less technical problems in station work. They include questions of practical management, adaptation of known laws and rules to local problems, improvement of farm practice, and adjustments to a particular farm or community of results already worked out. Practical help of this class builds public appreciation and enables the college to command support for its work. Stations generally have given full consideration to this phase of their work, since contact with the problems in the field tends continually to emphasize local and seasonal questions most easy of solution, throwing more technical problems into the background.

The progress of station work continually calls attention to the many problems in pure science which may be and actually are of prime importance. The station which does not carry its full share of such technical problems will find as the years pass that it is less and less able to deal with the immediate problems of plant development, soil management, animal nutrition, disease control, etc. While the number of such technical problems under investigation at any one station should not be large at any one time, each department or division of the station work may well have under consideration one or more such projects, which can be answered when public demand for such information becomes pressing.

In the selection of a project the following questions might be asked:

Will the solution of this project be followed by improvement of methods and material benefit?

To what extent will the industry be benefited?

Has this project already been solved by some other station, or have the foundations for its solution been laid elsewhere?

Is the problem actually capable of solution when submitted to scientific methods?

Has the station the means to carry this project to a final solution?

Is the staff available or can suitable persons be secured for this work?

I have put this general analysis of the problems of research before the discussion of the station worker, because it seems desirable to have a comprehensive survey of the field itself before a corps of investigators are assembled with which to attack these problems.

The station staff should make a critical analysis of the agricultural problems of the region and determine their relative importance. The staff might be assisted in the selection of projects by calling in counsel leading farmers.

There are certain fundamental problems, like soil fertility, which are not yet pressing in the new farming areas, but which experience has shown will be increasingly important with continued cropping. Experiment stations in these newer areas should give consideration to such problems before they become critical and adversely affect the production in the region.

The leading members of the station staff should, of course, be men of considerable experience in research. Their efficiency will be greatly increased if they can have associated with them younger men, well trained in fundamental science, who have sufficient personal knowledge of their problem to carry the details of its investigation under proper supervision.

The question as to what constitutes sufficient fundamental training to undertake lines of investigation is a very live problem. The average young man entering college is wont to inquire what opportunity, measured in dollars, is open to him upon the completion of his course. If he has come up through the environment of the average farm boy he is likely to give altogether too much emphasis to so-called practical subjects and altogether too little emphasis to fundamental training in the sciences, such as would make him available for scientific research. The man well trained in science and able to read the literature in scientific fields, both in his own language and in foreign tongues, has a very decided advantage over the man of less systematic training, even though his contact with the problem may be more limited. A bachelor's degree does not guarantee ability in research. Research workers must be selected with critical discrimination if progress is to be made in this field.

Personality and genius in investigation are important. Coupled with systematic training they represent the highest qualification of an investigator. The former will always be a driving force, and the latter the means—the tools with which to reach achievement. Genius and personality without systematic training are not likely to bring large achievements in research.

The problem of investigation in an experiment station always revolves around the problem of finance. Experiment stations supported by taxation must appeal to the people for support. Just at present the problems most in the limelight are those of distribution and price, rather than of production. Stations in position to study these problems will have a distinct advantage over those not so organized.

Studies of market systems, methods of distribution, and the part of the consumer's dollar received by the producer may help to correct exist-

ing conditions and possibly to neutralize the present acid temper of society. Investigation in rural economics may well be stressed at this time to develop a larger and more available body of knowledge bearing upon cost of production and cost of distribution. Such information is the first step toward more economical marketing. It may also lead to a better distribution of land areas. Such investigations are, in my judgment, legitimate in an experiment station, but they should be carried on always with the scientific spirit and without prejudice or malice toward the system under investigation.

The efficiency of the experiment station would be increased by regional conferences of station workers who are interested in a common problem. Such conferences would bring about a better understanding of station methods, and frequently would prevent duplication of work in adjoining States. Many projects which are difficult and expensive to investigate should not be duplicated in a given region, one State or the Federal Government conducting the investigation for the whole country.

Investigation of farm problems, in order to be appreciated by the constituency for which they are intended, should receive the largest degree of publicity consistent with the facts, but should be divorced as far as possible from propaganda, upon which the country has been over-fed in recent years. Support for the experiment station will grow with public appreciation of its work.

The organization of the experiment station as an integral part of the college of agriculture has been mutually helpful to both. In the earlier stages of its development it was necessary that every person carry more than one line of work. Every departmental chair was a settee, unused from lack of time. Today we have largely outgrown this organization and the station staff, aside from the administrative force, should be able to devote their time to research problems.

The teacher may profit from carrying lines of investigation, but such work is likely to be interrupted and not to bear much fruit to the station. Much of the best research is now being carried on by men who do no teaching, or whose teaching duties are limited to instruction of graduate students who are carrying some projects under direction. Graduate scholarships which provide a half-time salary with a Master's degree on the successful completion of two years of work seems to be practical and advantageous in many lines of work. Such a plan gives more hands to the investigator and multiplies his results.

The argument which applies to the research worker does not, in my judgment, apply equally to the administrative staff, although there may be differences of opinion on this point. Here broad contact and coordination of teaching, research, and extension work seem to me to offer greater advantages than would follow by separating the administration of the station from the college and extension work, tending thereby to create competition rather than cooperation between the various branches of the institution.

E. W. ALLEN, United States Department of Agriculture. There is one factor in connection with the development of the research spirit in the institution which seems worthy of mention, and that is a means for maintaining closer contact between those who carry on research and those who are

chiefly engaged in teaching and extension. At many colleges a science club is maintained, which brings together all the teachers and investigators and extension people in the institution or in a particular field. Such a contact is helpful to the teaching faculty, who must be largely relied upon to instil into the undergraduate body an intelligent understanding and appreciation of research and what it means. Such an attempt to build a larger intelligence about the progress and means of advancement seems important, and may serve to direct the occasional student to advanced study in preparation for a career in research. Some means of maintaining this relationship between the whole faculty, including the station, in which the aims and methods followed, as well as the results are presented, may be extremely helpful.

One of the favorable factors of environment in our colleges at present is the development of the agricultural extension service, with a corps of administrators and specialists located at the institution, which may constitute a very important means of suggestion to the station workers and of contact with the outside public. Of course, I agree, it is very desirable for the station worker to maintain such a contact with the outside, but to do this it is not now as important or as feasible as formerly that he give any considerable part of his time to attending farmers' meetings, if use is made of the extension forces. It is undoubtedly advantageous for workers to meet organizations of farming people from time to time, but for the most part they will have to depend upon the connecting link which the extension service supplies because their investigations require their attention.

As to the use by the station of students engaged in graduate work, there is undoubtedly considerable opportunity, but I feel that care should be exercised to consult the advantage to the station and not to confuse the functions of the graduate school and the experiment station. At a number of institutions there is a noticeable tendency to merge the research of graduate students with the work of the experiment station, and to use funds and time of the station in promoting graduate instruction. In such cases the station is in danger of losing its distinctive character and its organization. While graduate students may frequently be used in connection with the work of the experiment station, to the advantage of both, evidently dependence can not rest on this class of help to any notable extent in planning for the carrying out of the research projects. For the most part it is to be regarded as an incidental feature rather than as an integral part of the station organization.

H. W. MUMFORD, Director Illinois Experiment Station. I think that the tendency to use graduate fellows as assistants is all wrong. In our institution the man in charge of a major subject is not permitted to use his assistants on it.

E. D. BALL, Director of Scientific Work of the United States Department of Agriculture. I am wondering if there is not a little misunderstanding as to the function of graduate training. Dr. Allen's suggestions would convey the idea that we were training graduate students to take positions as heads of the departments. I must admit there have been cases of this kind in the past—far too many in fact—but in general at this time graduate students are being trained to take positions as assistants where they



will work under the leadership and direction of men of long experience in research work. Working on some particular phase of a larger problem under the direction and guidance of an outstanding research worker or even in cooperation with other students might be the best kind of preliminary training for this kind of work.

There is, however, another side to this question which must be considered. It is of tremendous importance to the experiment stations that they make every effort to see that their workers receive adequate graduate training and that there is coming up a sufficient group of adequately trained men to meet their needs. Whatever program is necessary to accomplish this end will be the one that will provide for the greatest possible development of agricultural science. It might easily be that the output of immediately available material might for the present be slightly decreased but at the end of a period of years it would be measurably increased by the same method. We must, therefore, look upon this problem from the broadest standpoint of future development. It is certain that some of the most productive departments we have are training large numbers of graduate students. Dean Mumford has outlined one of the broadest and most comprehensive programs for the development of national research that has been given to this body in a long while. I wish to highly commend his point of view.

P. F. TROWBRIDGE, Director North Dakota Experiment Station. For eleven years it was my privilege to be associated with Dean Mumford in the investigational work at the University of Missouri and I can say that in the department with which I was connected we found that in one case a \$400 fellowship turned out as much constructive work during the year as did some members of the staff who were on full pay.

I think that the problem which we have at the larger colleges and at those connected with a university is quite different from the problem at the smaller agricultural colleges, but I think the same principle holds. In our institution we consider ourselves fortunate if we have the means to have one high-priced man to head our investigations, and that it is not a wise use of the funds of the station unless we can provide him with a great deal of assistance beyond the regular force to carry out his investigations. I don't mean just the assistants that will do the routine work for him, but that he, as the leader in that line of investigation, must have associated with him two or three investigators who are competent to take on minor lines of the investigation and make of them real problems for themselves, thereby deriving benefit from his leadership. It seems to me that it is the only way that we can build up our research work and train better workers at our smaller agricultural colleges. We can not offer them the opportunity of working for a doctor's degree, but we can offer them an opportunity of working for the master's degree. I find it very helpful if I can say, "We can't pay you more than a meager \$1,500, but we can guarantee to you that we can give you sufficient time so that in two or three years at the most you can receive the master's degree and at the same time have a position which enables you to live comfortably."

The Director of Scientific Work of the United States Department of Agriculture, Dr. E. D. Ball, discussed cooperation in agricultural research as follows:

## STATE AND FEDERAL COOPERATION IN AGRICULTURAL RESEARCH

BY E. D. BALL

That agriculture is a basic industry and that continuous production of an adequate supply of food and raw materials (cotton, wool, hides, timber, etc.) is essential to commercial and industrial development and to permanent national security and prosperity is almost a truism to the student of world development.

The American people have, however, witnessed such a remarkably rapid development of this country in the past half century that it should not be a source of wonder that they have not analyzed the situation but have taken it for granted that such development would always continue. They need, however, to have their attention called to the fact that the greatly increased production during the quarter century following 1870 was largely due to the development of vast new areas of rich and fertile land, greatly stimulated by the governmental policy of granting homesteads and timber claims. They need at this time to have their attention called repeatedly to the fact that such large and fertile areas are practically exhausted and that further increase in area will come from the development of smaller and less favorably situated tracts involving, in many cases, higher initial cost of irrigation, drainage, stump clearing, transportation or other development and in other cases larger hazards as of frost, flood or drought.

There will, no doubt, be a gradual and steady increase in the area under cultivation in the United States for some time to come. This increase in area will be relatively small, however, as compared with the present increase in population. There will be many economic factors involved in this problem. The higher the price of farm products relative to other prices, the more rapidly will these more difficult areas come under cultivation, and, at the same time, the higher the relative prices of farm products in America the less inducement for the development of the commerce and industry so necessary to continued national growth and expansion.

If the nation can maintain a relatively large volume of food production at comparatively reasonable costs, then the older and more exhausted soils of the East will be continually dropping out of the race, offsetting in considerable measure increases in acreage that will be made in the West.

In the same way, along our northern borders and the higher altitudes, where there is normally a large frost hazard, the extension of agriculture will be largely controlled by the relative prices, so that it will only be when factors unfavorable for great national development obtain that these areas will be expanded to their limit. In fact, much of this northern area will probably become more valuable for timber production than for food production at a comparatively early date.

Large areas of fertile soil, subject to periodic overflow, will be reclaimed when the returns on production will warrant the outlay. As these and other areas are drained it is probable that other areas in these regions will be found to be more valuable for forestry purposes, so that the net gain in area will not be as great as the gain in production.

It must also be remembered that industrial expansion and increase in population ordinarily withdraw considerable areas of land from production. The development of cities, industrial plants, railroads, and high-

ways all take from the possible producing area, often from the most rich and fertile sections. Parks, recreation places, summer and winter resorts, country homes, and other facilities for escape from the constantly increasing centers of population, will make still further inroads into the cultivated lands.

The American people are, however, being brought slowly to a realization that the food production of the nation has not been keeping pace with the population for nearly two decades and if the same ratio continues for an equal length of time the nation will not be on a self-sustaining basis. Once this is realized they will recognize that adequate increase in production to balance normal population increases can only be maintained by providing for the utilization of all available resources and supplementing them by a steadily increasing production from the present area.

This steadily increasing production from the present area can only be brought about by a much greater emphasis on research and a partial redirection of our plan of agricultural development, involving a much greater effort towards increasing the production *per acre* without reducing the effort to increase the production *per individual*.

Increases in *production* may be brought about by bringing up the methods of the poorer farmers to an approach to those of the better ones, but increases in the *possibility of production* can only be brought about by the developing of better machinery of production, that is, better plants and animals, better soil conditions, better methods of production and distribution, and by the removal of some of the handicaps that constantly reduce production, such as pests, diseases, unfavorable soil conditions, and the like. These are basic and fundamental things which require deep and protracted research, such as has never yet been given to the problem.

Most of our research work in the past has been directed towards the superficial things which offered opportunity for relatively easy accomplishment and quick results. Many serious problems which it was recognized would take long periods of time or large expenditures of money to carry out have never been attempted.

The first primitive trails in the wilderness must, of course, take the path that offers least resistance. The permanent roads of easy grades require cuts, tunnels and bridges beyond the financial ability of the early settler. We are now approaching in scientific research the permanent road stage and must tunnel through great obstacles that we have previously gone around and must bridge the chasms of the unknown if we are to make paths for permanent progress.

The time has arrived when America, if she is to hold her place among the forward-looking nations, must recognize her dependence on research and proceed at once to organize her scientific forces for the problems at hand and especially encourage scientific investigation and development in agricultural and industrial lines tending toward national development.

England has recognized her lack in this matter and entirely reorganized her agricultural research with a much increased budget and a more nearly adequate standard of salaries. France, in spite of her serious financial difficulties, has increased her budget and more than doubled and, in some cases, trebled her compensation to her scientific workers. The commercial interests of America have realized the value of organizing scien-

tific research for definite objects and are rapidly attracting the ablest and most efficient scientists to organize their research bureaus.

The United States has long functioned as a loose federation of independent States. Our whole national policy has been one of traditional independence. Such policy has been favored, in fact made possible by our former isolation. I say "former" advisedly because the tremendous developments in rapidity of transportation during the past quarter of a century and especially during the past decade, have almost annihilated distances and we have at last been brought to a realization, if not to an official declaration, of our relationships to the problems of the world.

If under the circumstances the States and Federal Government are to unite as a nation on a constructive policy of national development, based upon the production of an adequate food supply, this policy must be organized along broad lines and embrace the principles of cooperation in research and other factors fundamental to the development of such a research program.

The *first* fundamental to such a program is the encouragement of graduate training in scientific and industrial lines, possibly the founding of a national graduate university functioning through cooperation with the best developed graduate departments in the different universities and colleges. This can be accomplished with little or no expense to the States or Government by the organization of the graduate work of the country in cooperation with the better developed graduate departments, and the establishment of a policy encouraging the younger research men in State, Government, and commercial service to avail themselves of these opportunities. Research fellowships along agricultural and industrial lines involving projects upon which the States, the Federal Government, or other agencies were working could be established and correlated with the experimental work being carried on and, in this way, secure the active cooperation and assistance of the men in charge of these research departments. Among these leaders of graduate work will inevitably be some of the most brilliant and versatile minds available and their cooperation would materially strengthen and unify the scientific work of the nation. This could be accomplished with relatively little or no outlay that could not be directly charged to the research obtained.

The *second* fundamental is the provision for the prompt publication of the results of research along agricultural and industrial lines. The costs of publication of the results of research vary from one to six percent of the total expenditure incurred. It is obvious that any amount of money expended on research brings no return until its results have been brought together, the conclusions drawn, and the facts made available to other workers. Another worker can then take these results and start where the first man left off. Otherwise he would be compelled to begin at the beginning and work up to this point. The nation that establishes a policy of immediate and prompt publication of all scientific investigation will be contributing the maximum amount to the encouragement of research and to national development.

The *third* requisite for efficient cooperation is the adequate provision for preparation and publication of aids to scientific work, such as translations, bibliographies, indexes, and summaries. Only second in importance to the publication of current research is the provision for the publication

of those essential aids to scientific work enumerated above. There may be twenty or even forty different workers in the States, in the experiment stations, in private institutions and in the Government service all working along different lines of the same problem. If every one of these independent groups is compelled to search the entire literature of the whole world for every publication bearing on the subject, abstract it, and value its contribution before an adequate conception of the status of the project can be obtained, there will be a tremendous amount of duplication and wasted effort.

It is obviously for the benefit of the nation as a whole that every bit of the scientific effort along industrial lines be kept working at highest pressure in the most efficient way. The greatest contribution that can possibly be made to this end will be for the nation to undertake to prepare just such aids as this.

One individual with the facilities of the libraries in Washington will be able to provide a complete bibliography and summary of everything pertaining to a given subject. When this is made available State and Government workers can go on with assurance that they are starting on a firm foundation and in cooperation with other investigators can divide the field and arrange the work so that every particle of it will contribute to the final solution of the problem.

Very few of the States or local institutions have the library or bibliographic facilities, or even funds with which to publish, that would make it possible for them to prepare such publications; so that it is very rarely that work of this kind appears from other than governmental sources. There have been a few notable contributions from universities and experiment stations, but in general this must be a Government function and would be second only in importance to the prompt publication of original research. There is no reason why such manuscripts should not be prepared as frequently by State workers, in fact, under a cooperative scheme it would be possible, as the result of a conference of those interested in the problem, to designate the particular worker for such an undertaking.

The *fourth* fundamental to a broad cooperative research program is the recognition that knowledge is universal, that research knows no State or even national boundaries, that a contribution to science is a contribution to the knowledge of the whole civilized world, that a research carried on anywhere, inside or outside of the boundaries of a State or a nation, is of equal value as a contribution to a given problem. In fact, oftentimes more favorable environment for a particular research may be found in an adjoining State or nation and if such conditions exist it is a part of efficiency and economy to so locate the work.

It must also be recognized in this connection that leadership is the prime requisite of fundamental research. A man of vision, of inquiring mind, imbued with the real spirit of the scientist, which is public service, the service of mankind, is *the* only capable leader in an investigational field. Equipment and environment are more or less necessary but these can be purchased—the man must be found.

It should be recognized that the great contributions to world progress in the generations past have been made by a relatively few men and that this will always be true. It should also be recognized that there are literally thousands who can accumulate evidence, work out details, expand

ideas and trace relationships where there is *one* exceptional individual who is capable of freeing himself from the shackles of the accepted, who is willing to leave the beaten path and actually explore, who holds all information as relative and subject to investigation, who can critically analyze and evaluate factors and interpret results.

An architect with a master mind visions a great building. Hundreds of workmen, stonecutters, carpenters, and masons work out the details and bring the structure to completion. Not one of these workmen, however, could have conceived the structure—without the master mind it would never have existed. In scientific research the process is often repeated and at other times, reversed. The master mind takes the mass of detail that has been accumulated and evolves the final structure—a fundamental truth.

It must also be recognized that an individual may be gifted in one line and deficient in another and that by cooperation of different individuals these deficiencies may be supplied. Many a man with gifted vision has lacked organizing ability. Many a man of organizing ability has lacked a gift of vision to use the organization efficiently. There is no more pathetic a figure in all scientific work than a splendid organization without anyone of vision to see the problem. It reminds one of "the man who was all dressed up with no where to go." The World War has taught us of the power of organized effort, of the almost invincible nature of science as a weapon of warfare. It is for us to recognize its same invincibility as a factor in national development.

If there is to be true cooperative work among the States and between the States and Federal Government and a unity and organization of that work into a national program, there must be recognition on the part of the Government forces that much splendid research is being done in State stations, and that such leadership must be recognized and its working force, equipment, and efficiency increased for the national good. It must be recognized by each State that while its first responsibility is, undoubtedly, to its own people, that that State is a part of the great federation of States with a national unity and that its national obligation, as well as its best interests to the State itself, may often require that certain phases of an investigational program be carried on outside of its own boundary and still be supported by State funds; that for the efficient prosecution of a research project it may be necessary to transfer a research worker to another laboratory or to another environment or to bring in for a time research workers from other institutions. In other words, there must be a recognition that efficiency and economy in research must not be interfered with by State boundaries or limitations of personnel.

Any national program of cooperative research must, undoubtedly, recognize that the total number of projects attempted by a given State should be reduced by at least one-half and the efficiency of those projects could then be trebled. It is, undoubtedly, true that this would apply with equal force to the government projects. In fact, it is probable that in a national conference in each line of agricultural research in which a fundamental program of cooperative investigation was outlined, that the number of projects of a superficial nature, both Government and State, which could be dispensed with, would be found to be three-fourths of the total number in existence, while, undoubtedly, such a union of forces and their

application to fundamentals would increase the efficiency of the work ten-fold.

Someone will suggest that this is an idle dream. It is, as far as immediate application to the entire program is concerned, but there is at present a fine body of cooperative work under way with every indication of a rapid increase. If the scientific men and the administrative officers of scientific research in this country are what they profess to be, scientists imbued with the spirit of public service, there should be little difficulty in bringing the greater body of research into the right relationship.

Before discussing the details of how such a program can be brought about there is a *fifth* major factor in national development that should be considered and that is the development of closer cooperation between the rapidly growing scientific research bureaus of the agricultural organizations and industrial combinations and the work of the State and Federal departments so as to direct and coordinate all possible effort toward national development. Most of the research work of these organizations will of necessity be directed along lines comparable with the interests of the industries concerned, but the larger amount of this investigation can by wise guidance and proper cooperative effort be harmonized with and organized to contribute largely to a general research program.

The aggregate volume of this research will, undoubtedly, be greater than that contributed by both State and national agencies and any movement to strengthen and develop this along right lines will be highly appreciated by the major portion of the interests involved and will be in line with constructive, national development. The National Research Council is functioning admirably to the extent of its resources and opportunities in this matter. It is, however, handicapped by virtue of the fact that its field does not cover all lines of agricultural endeavor and by other limitations. An expansion of its field and an encouragement of its efforts will contribute largely to this end.

The practical minded man will long ere this have been asking, "How is this State and Federal cooperation to be brought about?", and we must, therefore, discuss some factors of ways and means. In discussing this we must first, however, recognize that methods of cooperation must of necessity be as diverse as are the men and the projects involved. Cooperation in order to be successful must be entirely unrestricted as to method and procedure. It must arise out of mutual confidence, sympathy, good-will, and a desire to serve, and it must in the ultimate analysis rest largely on this foundation.

For the purposes of discussion we may consider several types of cooperative effort as now undertaken:

The *first* type is the simple cooperative agreement involving a single bureau of the Government and a single department of a station. The most common method of carrying this out is the agreement of the two parties as to the plan and scope of the work to be done, their mutual agreement on a leader to have charge of the work who thereafter becomes the representative of both parties in its prosecution. It is relatively immaterial as to whether this individual is actually paid by one cooperator or the other or jointly as long as the entire support of the project is on the mutually agreed basis. The cooperative agreement should be as simple as

possible, without undue restriction on the freedom of either party and should usually provide for four major stipulations:

(a) A mutual agreement as to the plan of the cooperative work and as to future modifications as the experiment progresses.

(b) Leadership in the project which shall be mutually satisfactory to both contracting parties. Provisions giving authority to this leadership to carry out the work and obligate both parties to the extent of the cooperative agreement.

(c) A mutual understanding as to the financial contribution of both contracting parties. This should include a simple statement of equipment, buildings, or facilities to be furnished by one or the other.

(d) An agreement as to publication of the results. This should usually contain a provision that either party may publish the results provided advanced copies are furnished for the information of the other.

There are thousands of such cooperative agreements in effect at the present time and where they have been entered into in good faith by scientists imbued with the spirit of research, they are working out to the mutual advantage of both cooperating parties.

A slight variation of this cooperation which has been found to be advantageous under certain conditions has been where the money is pooled and the field of work divided, one cooperating party taking entire charge of one line of investigation and the other of another. This is often a good plan where the two investigations are more or less complimentary to each other and both tend toward the solution of a single problem. The Federal Government has, for example, found this type advantageous in the past in its work in irrigation and drainage and in the division between the strictly engineering and agricultural features of the irrigation problem.

A still further modification of the simple cooperation would be where a certain line of investigation was now being carried on by one party and the other party offered to supplement it by the undertaking of cooperative lines of investigation upon the same plots or animals that would tend to assist in the interpretation of results.

The *second* type of cooperative work would embrace more ambitious programs involving a number of States and in many cases a number of research agencies in each State and in the Federal department. The usual method of procedure in this line of work would be a conference of all parties interested in the solution of some national or regional problem, the careful working out of the status of the problem and of the lines of investigation needing prosecution. These would then be subdivided and apportioned between the different agencies according to the environmental conditions or more usually, according to the special research qualifications of the individual. The work on the project would then be undertaken, usually under a mutual agreement as to the whole group and under specific cooperative agreements between the Federal department and each individual cooperating State, leaving the State to work out its own arrangements between the different cooperating agencies within its borders. This plan makes possible the placing of the most eminently fitted specialists in charge of each different line of research upon the problem and at the same time provides for the duplication of experiments under different environmental conditions. Provision is also made for annual or semi-annual conferences in which each cooperator becomes acquainted with the very latest details



of the progress of the research in the various lines without waiting for the tedious delays of publication. Such a cooperative agreement as this is well illustrated by the work on the black stem rust of wheat that was outlined to you last year and the striking rapidity with which discoveries and scientific advances were made in this field is indicative of the value of this type of cooperation.

The *third* type which has yet been rarely practiced in this country, but which offers even greater opportunities for increased efficiency is the searching out of the exceptional investigator or the exceptional investigation and contributing outright additional funds. In the present condition of research work in America a contribution of 20 or 30 percent additional would oftentimes practically double the possibility of accomplishment. The writer has in the past year visited a number of remarkably valuable experiments in which the equipment was adequate, the over-head provided, but on which they were so short of scientific workers to carry out the details that not more than one-third of the capacity of the experimental plan was being utilized. Others have been visited in which a tremendous amount of money was being expended in the maintenance of large experimental plats or feeding pens, as the case might be, and yet many scientific factors which would aid in analyzing and interpreting the results obtained were not being carried out for lack of funds.

There is a *fourth* type, though not strictly of a research character, which is so intimately bound up with the research field that it must be considered in this connection. These projects embrace the development of eradication programs, which in order to be successful require not only cooperation, but cooperation of every one of the States involved. The major portion of our eradication programs, like that of the barberry, involves a large amount of preliminary research and a continuation of a research problem in connection with the carrying out of the program.

Thirty years ago all the essential facts of the origin and distribution of the black stem rust of wheat were supposed to be well known. The barberry's relation to its propagation was considered to be an incidental one, important in its biology but not necessary to its perpetuation. Individual investigations raised a question as to the accuracy of these conclusions and probably the largest and most thoroughly cooperative investigational organization ever brought together in America for a purely agricultural subject has shattered practically every one of the ancient traditions. This rust, instead of being a single invariable species, is found to be made up of more than thirty biologic forms of widely varying distribution and equally variable in their virulence to different grain crops and even to different varieties of wheat. The probability of survival in the northern region without the barberry has been generally discredited. The possibility of spore distribution through the air is proving to be a fertile field for investigation. Experiments in the chemical destruction of perennial plants have opened up another field of research, and while the eradication program is well toward completion, the investigational field is still widening.

Much of the trouble with cooperative work in the past has been the desire on the part of both State and Federal agencies to obtain all the credit possible from a given field of research in order to warrant increased appropriation and such an attitude of mind was at one time justified. The

appreciation of scientific work has, however, increased so enormously in the last ten years that today this factor of the problem is, from the standpoint of the national budget at least, relatively unimportant. The committees of Congress understand the value of research and so thoroughly appreciate the economy and efficiency of cooperation that such a project will have an increasing appeal to their sympathy and support. With this change in attitude it will now be possible for the Federal Government to direct a large proportion of the local publicity to the credit of the State agencies and thus increase the local support of the project.

This factor in the problem might be considered to be of relative insignificance if it were not for the ubiquitous publicity agent—"may his tribe decrease!" The exigencies of the war situation so increased the abundance of this type of pest that it is possible that an eradication campaign will have to be inaugurated. If we could develop a biologic form imbued with the idea that his purpose in life was to educate and furnish information rather than to laud the accomplishment of the individual or the department, it would be one of the greatest accomplishments of animal breeding of this generation.

In discussing the practical side of this question it will be urged that there are a large number of individuals who do not wish to cooperate. This is undoubtedly true. A very large percentage of these individuals are not, however, research men and we are discussing at this time cooperation in research, not cooperation. The great majority of the truly scientific research men of both State and Federal departments can be enlisted in strictly fair and broad-minded cooperative programs.

In order to make this program possible of accomplishment, however, it is almost imperative that the Federal leadership of research projects should be in the hands of broad-minded research men of vision and sympathy with cooperative relations. The increase in salary standards granted the department at the last session of Congress has made possible a material advance in this direction. Many lines of work already possess this leadership, but due to the inroads upon the department's research forces during the previous starvation period, a considerable number of other leaders will have to be brought in from the outside. The success or failure of the entire program depends to a large extent, however, upon the ability of the department to secure such leadership. There is no question but that every one connected with the station and college administration will agree in the abstract to the soundness of this position. When it comes to giving up a gifted individual from your faculty the problem will, however, present other aspects.

It must be urged in this connection that it is so greatly to the interests of the colleges and stations to see this type of sympathetic Federal leadership increased that they may well justify an occasional loss, especially since they may be assured in return that the Department will be more than willing to reciprocate as it strengthens its staff and has desirable workers to offer from time to time. A very much more frequent transfer from college and station work to Federal service and *vice versa* will of itself be a helpful factor in bringing about the establishment of much more cordial understandings and relationships. The establishment of a system of advanced training for Federal workers in the graduate institutions would of itself accomplish much in this direction.

Your Executive Committee has considered this problem and recommended to the Secretary of Agriculture the appointment of a Director of Scientific Work, with the idea of developing cooperation and coordination of all scientific activities. You have also appointed a Committee on Projects and Correlation of Research, so that your association is already definitely committed to such a program, yea, more, is largely responsible for its inception and direction up to the present time. I trust you will instruct your committee to take an active interest in the further development of cooperation.

The writer recently visited the Ohio Experiment Station and spent some time in a study of the results of the long time fertility plats. The results of these varied treatments are being measured entirely by the resultant crops produced. As the writer looked over this work he could not help but wonder if the interpretation of those results might not be materially strengthened by a careful study of their effect on the chemical constituents of the soil, of a separate study of the physical changes that had taken place, a further study of the bacterial content as affected by the various treatments—possibly even this should be extended to include the effect on the fungi and the protozoan constituents of the life of the soil. It might be well to study the water-holding capacity as affected by the treatments applied. It is impossible to tell how much new light might be thrown upon the interpretation of these results by an adequate series of studies of this nature. On the other hand, there is a wonderful opportunity in all of the varied and known conditions existing on those different plats to study their effect on the other factors. The entire overhead for the maintenance of these plots is already provided. The establishment of the correlated lines of research would be a comparatively simple and inexpensive addition. It seems to me that there is a wonderful opportunity for cooperation.

In the same way, the average feeding test is judged entirely by the resultant weight of the animal produced. All of the overhead expense must be incurred for the one measurement. At the same time there might be carried on studies of the variation in the chemical content of the different products, as well as the physical changes taking place during the growth period. In another experiment they were testing the relative importance of a certain vitamine. Interesting results were shown which indicated that there might possibly be a complicating factor in the change in the intestinal flora or fauna as the result of the different rations used—another chance for team work and the possibility of shedding much further light on the action of these elusive substances.

The animal husbandry research work of this country has been greatly retarded by the extreme cost of the equipment and overhead. In studying the problem from the standpoint of the Federal Government, it appears that practically all of the Federal work on these projects could be carried on in cooperation with the plants already in existence in the various States. Few, if any, of these projects are local in nature. The amount of research work carried on in these different locations could be doubled or trebled with a relatively small increase in the total cost of maintenance and at the same time, a fairly complete program of development inaugurated.

It is probable that in the eradication field lies the greatest single opportunity for immediate large-scale, national, cooperative efforts; and or-

ganizations should undoubtedly be perfected to make possible the researches necessary to put some of these into immediate effect. The successful efforts toward the eradication of the foot-and-mouth disease and the citrus canker, the elimination of a large number of outbreaks of the gipsy moth in various regions of the United States, the rapid reduction in the tick-infected area, the elimination of sheep scab from the larger part of the range, the success of the tuberculosis campaign and of the barberry eradication, point the way to the possibilities of eliminating some of the heavy overheads now carried by agricultural production. The warble fly in the backs of the cattle appears to offer a favorable opportunity and is now being tested on an experimental basis. The codling moth in the apple could be eradicated with the elimination of a single crop of fruit. Taken in connection with a killing frost, it would be possible to eliminate this pest from a whole area at little cost. American foul brood, the most destructive pest of the beekeeper, could be entirely eradicated by a concerted movement starting in the areas of production and gradually working towards the larger cities. These are only a few examples of the hundreds of opportunities for the permanent reduction of the burdens that oppress agriculture. What is needed is strong and aggressive leadership, combined with the organized cooperation of the scientific workers in the field involved. America has led the world in the production of food and raw materials and at the same time has developed into a world power standing for freedom and justice. If she brings to bear upon her present production and distribution problems the entire force of her organized scientific strength she may continue to grow and develop as she has in the past and maintain her leadership as the bearer of the torch of liberty and equality.

#### DISCUSSION OF DOCTOR BALL'S PAPER

H. W. MUMFORD, Director Illinois Experiment Station. In the few things that I shall have to say, I do not presume, with my limited experience, to speak with authority and I must reserve the privilege of changing my mind and any opinion I may now express.

In justice to Dr. Ball and those of you who may hear this discussion, I should explain that through no fault of mine I have had no opportunity of knowing the contents of the paper just read and I am, therefore, embarrassed by not being able to discuss it intelligently.

If the directors of all the State experiment stations were polled on some such question as, Is cooperation in agricultural research between the Federal Department of Agriculture and the State colleges of agriculture desirable, at least ninety percent of them would answer in the affirmative. This opinion, however, would be no sooner expressed than these same directors would begin to qualify their answer by such expressions as "proper cooperation," or "under certain conditions." There would be a very great difference of opinion as to what constitutes proper cooperation and what should be the basis of cooperation. I wish to drop the subject with this observation at this point and return to it later.

It may not be out of place to express a strong conviction that unless the greatest care is exercised we shall destroy the confidence, and having destroyed the confidence, the destruction of our support will quickly follow, that it has taken a half century of patient constructive work to build up.

Starting out with a widely distributed strong prejudice against so-called book farming, the agricultural college and the experiment station have, as time is measured, rather quickly established themselves as very serviceable institutions worthy of the confidence and support of the public.

In bringing about a better attitude upon the part of the general public toward agricultural education and experiment station and extension work, as well as the actual assistance rendered in improving the grade of work done throughout the country, the Federal Department of Agriculture should and does receive much credit.

A point in the development of agricultural college, experiment station, and extension work has been reached where great care must be exercised in maintaining and extending the confidence of the farming and general public in our research and educational activities. The rapid expansion of the agricultural extension work has hastened this development and to the degree that it has contributed to building up confidence in, and support of, the agricultural college and experiment station, it is to be commended and encouraged. Unfortunately, however, there has been a quite general tendency for the extension service to attempt to justify itself as an independent institution, and in that over zealous attempt methods have been used which have placed the college and the experiment station on the defensive, and the recognized three-fold function of our agricultural institutions have, not infrequently, been placed on a competitive rather than a cooperative basis. Sometimes indeed the extension representative has attempted to establish confidence in extension work by destructive criticism of representatives of the experiment station and agricultural college, or of these institutions themselves. I do not mean to infer that this has been either general, deliberate, or even conscious in a very large number of instances. I do say that it has been too general, that there has been too much of it that has been deliberate, and altogether too much of it that has been unconscious. It is unquestionably true that this situation has developed largely because of a lack of understanding as to the proper function of the extension worker and the ultimate dependence, and the very permanence of the extension work itself, upon the college and experiment station. I do not overlook the difficulties involved in the task set for the extension service, a fact which has been too often overlooked by experiment station workers, who have many times been protected and shielded from agricultural contacts which at times are openly critical and sometimes very properly so. This problem the extension men must meet and we must be patient if at times they attempt to pass these criticisms on to our staff. With the proper administrative control, the deliberate forms of destructive criticism can be relatively easily dealt with, if taken in time. It is, however, cause for anxiety when there are in the field frequently a much larger force of relatively inexperienced men, in constant contact with the people, who are attempting to interpret the teachings of the college and experiment station to the farmers of a State, than there are on the faculty of the college and staff of the experiment station combined.

With all the progress that has been made, there are still a very considerable number of people in the open country who are exceedingly skeptical of the real value of college and experiment station work and it is not to be wondered that many extension men have been unconsciously led to become skeptical. It is the old story of the young man disinheriting his

parent. But, you ask, what has all this to do with Federal and State cooperation in agricultural research? My answer is, a very great deal.

The most highly developed example of Federal and State cooperation is on the extension side of our agricultural program, the least developed example is on the side of the agricultural college. It is not too much to say that our agricultural extension activities are causing most anxiety and concern and our agricultural colleges the least. In other words, I am feeling that our agricultural colleges have shown the most satisfactory development and our extension work the least satisfactory, taken from all angles, contacts, relationships, and tendencies. I do not attribute the difficulties so much to attempts at Federal and State cooperation in extension work, on the one hand, and the lack of such cooperation, on the other hand, but to the nature of the problems involved.

In attempting to determine policies with reference to State and Federal cooperation in agricultural research, it is worth while to raise the question as to whether the problems involved in experiment station work are more nearly like those of the college or of the extension work.

It may be profitable to call attention to the one outstanding reason given by a large majority of directors of State experiment stations for encouraging Federal and State cooperation in agricultural research. The main reason given, in a majority of instances, is financial considerations. Others go on to explain that even here it would be far better to be financially independent, and that a dollar of State money will go farther than a dollar of Federal money, while some directors state their dissatisfaction in being obliged to deal with inexperienced Federal representatives; still others express satisfaction in receiving the assistance of experts of superior training and wider outlook. Undoubtedly both instances are quite common, all of which emphasizes the difficulty in attempting to generalize on such an important question as State and Federal cooperation in agricultural research.

Speaking generally it has been easier in the States to secure support for college than for experiment station work. Is it not possible that this is partly due to the fact that the State has been made to feel that it can not lean or depend on the Federal department for financial support in college work? Do not our possibilities of greatest development in agricultural research lie along the line of developing that same sense of State responsibility for experiment station work? Can that best be done by further emphasizing or encouraging Federal and State cooperation that involves financial and administrative dependence? I think not.

I think that in the long run the largest and best development along the lines of agricultural betterment will come from the promotion of the idea of the State's responsibility for agricultural research, combined with the encouragement of Federal and State cooperation in agricultural research that leaves both the State and Federal authorities independent, as far as financial and administrative considerations are concerned. In other words, cooperation that is purchased at the price of financial and administrative dependence is vicious. That the cooperation of the Federal and State authorities is needed to promulgate this idea needs no supporting arguments.

Perhaps the basis of cooperation can be better understood if it is stated that there is today a very great need of cooperation between State

experiment stations in agricultural research. The lack of such cooperation is largely due to the selfishness of investigators, growing out of the belief that if we expose our research plans to investigators in other stations they will take advantage of such information and attempt steals of greater or less magnitude. It is regrettable that such impressions have in some instances developed from, or because of, more or less tangible affirmative evidence. In promoting this spirit of cooperation in agricultural research between State experiment stations, obviously there could not be any thought of financial assistance or the relinquishment of administrative responsibility. This does and should simplify the problem of true cooperation. However, it must be admitted that there is better cooperation between the State and Federal departments than between State stations.

This idea of a better spirit of cooperation could be profitably stressed still farther by pleading for greater harmony and cooperation between departments within the State institution and between bureaus in the Federal departments. There is at present a well known lack of such cooperation, a lack which is more pronounced in some institutions than others, and a lack which all administrative officers deeply deplore and are disinclined to admit, as far as they may seem to involve the institutions over which they may have the honor to preside. I refer to this simply to emphasize the obvious fact that many of our investigators have not yet learned some of the more simple forms of cooperation. It is not to be wondered that these same individuals have failed and will continue to fail to establish proper relationships where such relationships involve contacts and agreements with parties outside the institution. I am convinced that the largest opportunity in securing greater cooperation lies within the institution, between departments representing different lines of work, and then between the faculty of the college, the staff of the experiment station, and the extension representatives.

We need more real sportsmanship, to say nothing of plain honesty, in the research field. Here again we need the wholesome example of the Federal department and its cooperation in promulgating the idea.

Without the closest cooperation of agricultural college, experiment station, and extension activities, we are in very great danger of killing the goose that lays the golden egg, the goose in this case being the experiment station.

Just to the extent and degree that the Federal department encourages the separation and segregation of the college, experiment station, and extension activities for administrative convenience, just to that extent are they tending to destroy the development of agricultural research in the States.

This is a much larger question than administrative convenience and the sooner this fact is recognized by both State and Federal authorities, the sooner will agricultural research, agricultural colleges, and agricultural extension be on a safe basis, a basis upon which we may all cooperate and feel comfortable, instead of the present uncertainty that we may be approaching a volcanic eruption just around the corner.

I am convinced that we are already headed for a large amount of administrative inconvenience and a considerable amount of institutional inefficiency because of an attempt to secure idealistic administrative convenience and institutional efficiency.

Possibly, I fail to make myself clear. It must be admitted that from the standpoint of immediate administration a director of the experiment station and a separate director of the extension service may simplify some administrative problems and may secure greater immediate results in the experiment station, and possibly in the extension service, but experience is proving that eventually such attempts at separation and segregation add to administrative difficulties and tend to create friction and if there is one thing more than another that interferes with effective work, it is lack of harmony.

I have dwelt somewhat at length on this question, partly because there is a tendency to let matters drift, and partly because of the difficulty of viewing this problem from an entirely unbiased viewpoint. Once a strong administrative unit or an administrative policy has been established, it is difficult to get the merits of the case considered. Because of this fact we should be slow to build up an extensive system of cooperative agreements without the most careful consideration.

I believe all will agree that there is every reason for building up within each of the States strong, vigorous agricultural institutions, able to stand alone, and that these institutions and their friends should be interested in giving assistance in building up the strongest Federal department of agriculture which the people are able and willing to support, that both may function along lines which are generally recognized as their particular fields and work together in solving problems which call for joint effort, on such a basis as will secure the quickest and most satisfactory results without weakening either the State experiment station and its support, on the one hand, or the Federal department and its support, on the other.

When it comes to working out the details of such a policy, it is believed that the conditions in the different States and in the several bureaus of the Federal Department vary so much, to say nothing of the personnel, which after all is about the largest factor involved, that it is a waste of time to attempt to standardize these relationships except along the very broadest lines.

#### ELECTION OF OFFICERS FOR THE SECTION OF AGRICULTURE

The following officers for the Section of Agriculture for the ensuing year were duly nominated and elected: Chairman, C. F. Curtiss of Iowa; vice-chairman, R. L. Watts of Pennsylvania; secretary, B. H. Crocheron of California.

Adjourned.



## SECTION OF AGRICULTURE—EXTENSION WORK

TUESDAY MORNING, NOVEMBER 21, 1922

The chairman of the sub-section, T. O. Walton, Director of Extension of Texas, presided.

The first paper presented was by M. S. McDowell, Director of Extension of Pennsylvania, as follows:

## A METHOD OF MEASURING EXTENSION WORK

BY M. S. McDOWELL

The measuring of results is one of the most important factors in the development of a business enterprise. A system of bookkeeping which will show with accuracy the condition of the business at all times and by which progress can be measured from time to time is an essential of good business practice. In business there are, however, definite units of measure which can be applied. Sales and inventories can be expressed in pounds, tons, bushels, yards, gallons, etc., and a definite price per unit can be applied.

It is difficult to find a basis for definitely measuring the results of extension work. The people of a county or a community probably have a general idea of the value of what has been done but might find difficulty in expressing it in concrete terms. The character of the work is such that it does not lend itself to ordinary methods of measurement. A system of measurement is needed which will help to show where the extension work is falling down, and at the same time point the way to changes which will make it more effective in the community.

If every farm could be reached, the extension service would be fulfilling its mission so far as distribution of effort is concerned, although this contact would not necessarily give a measure of the real accomplishments. In other words, the individual farm is the unit and every farmer who is led to practice improved methods as a result of extension work is being definitely and helpfully reached.

The total number of demonstrations conducted is the means generally used to indicate the extent of the work, but this system is unsatisfactory. Since there is such a vast difference in the character and value of demonstrations their total number means very little.

For instance, in a cow-testing association every member of that association is being reached in a definite way and each individual farm receives direct benefit because each is practicing better methods. A corn variety demonstration or a poultry culling demonstration may be conducted on a particular farm in a community. There may be one hundred people present at a meeting to see the result of the corn variety test or to witness the poultry culling. The farm on which the demonstration is conducted will be reached in a definite way and the practice which the demonstration shows to be profitable is usually followed, but how many of the one hundred people present will go home and practice what has been demonstrated? Probably not more than one out of every five or ten present. Definite and profitable contact, therefore, has been established only where something which has been seen or received is practiced.

Manifestly it is not possible to develop a unit of measure for extension work which can be applied in as definite a way as yards or pounds are used to measure dry goods or groceries.

An arbitrary scale of "farm contact factors" by which every piece of work could be measured in terms of the number of farms definitely reached by each project is suggested in the following list:

TABLE OF FARM CONTACTS AND EQUIVALENTS

- 7 for each of the following organizations and 1 for each member:
  - A. R. O. testing association,
  - Cow testing association,
  - Bull association,
  - Boys' or girls' club and 1 for every 15 persons attending a roundup,
  - Milk testing club,
  - Community hog breeding association,
  - Ram association,
  - Potato or orchard spraying group,
  - Cooperative lime crushing group (5 where membership is not definite),
  - Cooperative milk marketing association fostered by extension service,
  - Cooperative dairy manufacturing plant fostered by extension service,
  - Cooperative marketing or shipping association fostered by extension service,
  - Central grading and packing house fostered by extension service,
  - Wool pool,
  - Adult poultry club or association.
- 1 for every 50 entries at a county farm products show and 1 for every 100 people in attendance up to 1,000 and 1 for every 500 above 1,000.
- 5 for a local farm products show.
- 10 for a farmers' day and show.
- 7 for each field or orchard demonstration where a field meeting is held and 1 for every 10 in attendance.
- 7 for each poultry management farm where all 3 meetings are held.
- 7 for each beef management farm.
- 5 for each demonstration comparing two varieties, etc., or where no field meeting is held. In case of D. F. S., 5 for each neighborhood.
- 5 for each reforestation tract planted which will serve as a demonstration.
- 5 for each judging contest conducted and 1 for every 5 contestants.
- 5 for each judge furnished at a fair.
- 1 for each farm reached by any farm bureau marketing project not mentioned above.
- 5 for each cooperative purchasing association and 1 for every 10 members.
- 1 for each roguing, pruning, shearing, docking, castrating, dipping, culling or similar demonstrations and 1 for every 10 in attendance.
- 1 for each member of a farm loan association formed during year.
- 1 for every 15 persons attending any strictly farm bureau livestock roundup, or field day, or stop on an auto excursion, other than at demonstrations, or milk campaign meetings up to 150, and 1 for each 50 additional up to 500, and 1 for each 100 above that.
- 1 for every 10 persons attending a poultry feeding, dairy feeding, fertilizer or similar special meeting.
- 1 for each accredited herd application signed during the year.
- 1 for each farm supplied with seed which farm bureau is introducing.
- 1 for each farm producing seed for farm bureau distribution.
- 1 for every 5 farms assisted in securing seed other than the above.
- 1 for each farm on which purebreds are introduced or placed.
- 1 for each farm assisted in disposing of purebreds.
- 1 for each farm assisted in reforestation or woodlot management.
- 1 for each farm keeping an account book.
- 1 for each farm keeping cost records on one enterprise.
- 1 for each farm for which an individual ration was figured and 1 for 10 farms supplied with rations by circular letter.

- 1 for each dairymen's league or similar local assisted.
- 1 for each general livestock, crops, or similar association formed during year and 1 for every 5 members.
- 1 for each farmer in a 10-day short course times each subject covered.
- 1 for each miscellaneous meeting addressed.
- 1 for each farmer given help on a specific problem not covered in the above.
- 5-10 for farm bureau picnic.

This list of factors represents the consensus of opinion of a large number of extension workers engaged in various phases of work. It is not perfect and changes will be necessary from time to time to make it fit varied conditions, as well as to make it more accurately represent the probable number of farms definitely reached. However, it is believed some such system may be made helpful in the development of extension activities.

Definite aims and purposes are essential to the obtaining of satisfactory and progressive results. The keeping of proper and complete records of extension activities conducted throughout the year is necessary if measurements of any kind are to be attempted.

A chart of each county program, by communities, is made at the beginning of the year. At the close of the year this program is checked in the county office by someone from the college office and a line is drawn through projects which had been planned for but for some reason not carried out. From the records in the county agent's office all additional work which was not planned at the beginning of the year, but which developed later, as well as miscellaneous assistance given by the county agent is written into the chart in ink. This gives a detailed picture of what has been done in the county during the year and these records are used in compiling the farm contacts.

Some illustrations of the application of the suggested method of measurement may serve to give a better idea of the system. The following table compares the farm contacts with the values of the various products indicated. These comparisons may help to point out within the county how the program is balanced to fit the agricultural needs and what lines of effort might feasibly be given greater attention.

COMPARISON OF EXTENSION WORK AND AGRICULTURAL PRODUCTION

Counties	Dairy	Hogs and sheep	Potatoes	Other crops	Poultry
1 Production	\$3,127,014	\$744,448	\$1,543,360	\$11,106,189	\$2,142,788
Farm contacts	203	66	324	372	186
Index	15,404	11,278	4,763	30,000	11,520
2 Production	\$565,335	\$244,958	\$192,975	\$2,401,252	\$340,452
Farm contacts	301	86	137	290	113
Index	1,878	2,848	1,409	8,280	3,013
3 Production	\$2,692,642	\$515,079	\$733,078	\$6,043,809	\$1,194,254
Farm contacts	825	27	193	449	585
Index	3,264	19,077	3,799	13,483	2,038
4 Production	\$864,352	\$360,710	\$3,092,066	\$4,790,085	\$894,080
Fam contacts	13	20	475	249	8
Index	66,488	18,035	6,509	19,237	111,760
5 Production	\$2,054,390	\$359,468	\$566,632	\$4,141,714	\$569,132
Farm contacts	114	97	22	53	4
Index	18,021	3,706	25,755	78,145	142,283
6 Production	\$1,773,007	\$599,840	\$491,400	\$6,734,513	\$1,223,854
Farm contacts	12	191	167	245	57
Index	147,750	3,140	2,942	27,487	21,471

The values used in this table, with the exception of that of poultry, are from a State census made during the previous year. The term other crops includes corn, oats, wheat and hay. The "index" is the money value of the crop or class of livestock divided by the number of farm contacts. In other words, there is one farm contact for every so many dollars worth of value or production.

It should be borne clearly in mind that these figures can not be used as a means of direct or absolute comparison among the counties, since necessarily the size of the county, the character of the agriculture, the relative interest of the people, the length of time work has been under way in a county, the continuity of service of the workers, and other factors influence the amount of work that it is possible to do in any one county.

Relatively more contacts are possible in a small county with few communities than in a large county. However, one point which these figures emphasize is the need in a large county of effective organization in order to reach more people. The system is not meant so much to make comparisons between counties as to point the way for improvement within the county.

It should be understood too that the figures representing the "index" can not be expected to correspond. To make comparisons it is necessary to know the relative value of each class of livestock and crops. The "index" must be considered in proportion to the several values. What should the normal "index" be in each class? Inasmuch as the farm is the unit, the theoretical "index" should be the value of the particular class of livestock or crop on one farm.

The average values per farm for the counties included in the preceding table, are as follows:

AVERAGE VALUE PER FARM

Counties	Number of farms	Dairy	Hogs and sheep	Potatoes	Other crops	Poultry
1	6,089	\$514	\$122	\$253	\$1,825	\$352
2	5,290	509	97	138	1,142	225
3	1,626	348	151	119	1,477	209
4	2,959	293	122	1,045	1,686	302
5	3,702	555	97	153	1,119	154
6	5,593	335	107	88	1,204	219

These figures show what the several "indexes" should be if every farm were being definitely reached in each line of work.

A better idea of the relation existing between the various phases of the agriculture of a county and the work actually done may be had from a table which shows the percentage of total "farm contacts" compared with the percentage of total value represented by the particular class of activity.

COMPARISON BETWEEN TOTAL CONTACTS AND TOTAL VALUES PER FARM

Counties	Dairying		Hogs and sheep		Potatoes		Other crops		Poultry	
	Percent Contacts	Percent Values	Percent Contacts	Percent Values	Percent Contacts	Percent Values	Percent Contacts	Percent Values	Percent Contacts	Percent Values
1	18	16	5	4	28	8	32	60	16	11
2	32	15	9	7	15	55	31	64	12	9
3	39	24	1	4	9	22	22	54	23	11
4	2	9	33	4	62	30	33	49	1	9
5	40	27	33	5	8	17	18	54	2	7
6	2	17	28	6	25	5	36	62	8	11

In County No. 1 the work in dairying and with hogs and sheep is proportionate to the values of these items. In case of potatoes, work greatly in excess of the value of this crop in the county is being done. The same thing applies to poultry. In crops, only about fifty percent of the work which the value of this item represents is being done.

In County No. 2 proportionately more work is being done in dairying, potatoes, and poultry. Hogs and sheep are about evenly balanced and again crops work is only about one-half what the value would justify.

County No. 3 is strong in dairying and poultry work, pretty evenly balanced in potatoes, light in hogs and sheep, although again crops work is low in proportion to its value.

County No. 4 is an outstanding potato county and this item stands out in the figures. It is a little light in dairying, pretty evenly balanced in hogs and sheep, and more work in proportion to value is being done in crops than in any of the other counties represented in the table. Practically nothing is being done in poultry and yet this item represents almost one-tenth of the total value.

It is apparent that County No. 5 is weak in total contacts. This is probably due in part to lack of records. The work in dairying is high in proportion. Hogs and sheep are emphasized largely in excess of what their proportionate value justifies. Crops work is entirely too low in proportion and poultry could well receive more attention.

In County No. 6 dairying and crops need more emphasis, while too much work in proportion is being done in hogs and sheep and potatoes.

It should be borne in mind that it is not always possible to give proper attention to all lines of work in a single year and, therefore, the work in each year should not always be proportionate. These figures, however, may help to show lines that are being neglected and assist in keeping the program properly balanced through a series of years.

Attention should also be directed to the fact that there may be two ways of balancing a program. The number of contacts may be reduced to more nearly correspond to the values or the values may be raised to more nearly correspond to the contacts. There are instances in which the latter course is the proper one for the development of the agriculture of a county or a community.

The bent of the county agent may more or less unconsciously effect the relative development. These figures show up this tendency and help him to observe the fact. The same thing applies to the specialist and is helpful to the administrative office in balancing the county programs.

It is of interest to note how the contacts indicate the value of local leadership and methods of work.

The following table shows the number of farm contacts, figured in accordance with the method given, and the relation of these contacts to the manner in which the work was conducted and to the leadership.

COMPARING RESULTS OF COMMUNITY AND COUNTY PROGRAMS, 1921

Counties	Organized communities	Unorganized communities	Contacts per organized communities	Contacts per unorganized communities	Leaders per organized communities	Leaders per unorganized communities
1	5	16	92	49	4.6	2.0
2	6	9	104	64	2.0	1.0
3	5	8	61	26	1.2	0.5
4	7	12	43	25	2.5	1.0
5	4	5	130	71	4.5	1.4
6	9	3	80	54	3.6	2.0
7	9	8	49	27	3.0	1.0
8	12	4	57	28	1.6	1.2
9	8	4	94	61	2.0	1.0
10	11	7	50	25	2.0	0.4
11	5	12	62	53	3.0	1.3
12	10	5	79	22	2.5	0.6

Lack of records lessens the accuracy of the system but experience shows that the keeping of proper records in the county is being greatly stimulated. From an administrative point of view it is felt that this result alone has been worthwhile. Attempts have been made to make comparisons in a number of different directions, including agricultural economics activities, but the system is too new to venture any very definite statements as to possibilities at this time.

The following paper was presented by T. A. Coleman, Assistant Director of Extension of Indiana.

#### USE OF CENSUS AND OTHER STATISTICAL DATA IN DIAGNOSING A COMMUNITY'S NEEDS

BY T. A. COLEMAN

The county program of agricultural development must recognize all of the factors contributing to the economical, social, educational, and religious life of the community and must be organized with proper relationships one to the other. Many agricultural extension activities in the past have been organized and developed as unrelated projects, but in all such instances the best results have not been obtained. To illustrate: To put on a home improvement week, recommending the purchase of labor-saving

devices, etc., without taking into consideration the need for a greater income to meet these expenditures, will fail for this reason, or a recommendation for a change in ration for the dairy cow without considering the source from which feed may be secured, will not accomplish satisfactory results. Then again, to plan a local program of agricultural activities, without awakening a sufficient interest on the part of the local people will not secure the greatest returns.

Having these things in mind, we attempted to work out a program for the development of the agriculture and rural life in a district in south-eastern Indiana composed of the counties of Ohio and Switzerland. While we could have secured all the necessary preliminary information from the reports of the Census Bureau and the Federal and State departments of statistics, the results would not have been satisfactory, because in the first place, the people of the county do not read these reports, and in the second place, they are not convinced of their accuracy. Therefore, after making necessary preliminary arrangements, we made a survey of 100 farms in each of the four representative sections of the district. In this survey we asked pertinent questions relative to agricultural activities, methods, and general practices in relation to production, distribution, and marketing. This survey was carried out by the farmers themselves and was believed in because they were parties to it. Data secured from these sources were tabulated, summarized, and conclusions drawn based upon this material, supplemented by similar information from census and statistical reports.

Subject-matter specialists met with local committees appointed to carry on certain lines of work which were indicated as necessary for the further development of the several enterprises.

As an evidence of the necessity for the study of all of the factors relating to agricultural production, this survey developed the fact that while dairy products constituted a large part of the sales from the farms, the returns per cow were not up to the average. Investigation disclosed that straw, stover, and timothy furnished most of the roughage. The farmers stated that, although they recognized the superior value of clover or alfalfa in the dairy ration, they were unable to grow the clover on their land. Further study revealed the reasons for these legume failures.

The fact was also developed that returns from the poultry flocks were not as large as should be expected. A study of the rations suggested the value of skim milk as an addition to the menu.

When these factors were all brought together the program worked out embodied soil improvement, increased acreage of legumes with the slogan, "An Acre of Alfalfa for Each Cow," pasture improvement, better dairy sires with the idea of growing young animals to replace older or inferior ones in the herd, feeding of skim milk to poultry along with other grains, improvement of housing facilities for both livestock and poultry as greater returns are received, and, along with the whole program, a concerted movement to develop better homes, roads, schools, churches, etc.

Because of their participation in this preliminary work, all the people and particularly the active committees became very enthusiastic about the work and entered into it wholeheartedly.

The following extract from a letter received from Mr. Lucian Harris, banker of Rising Sun, expresses in a forceful way the situation. He says,

"I feel that this work has been done at a very opportune time. Our farmers were discouraged almost to the point of despair, many of them renting their farms and moving away to engage in other lines of work. The influence and encouragement wielded by your men evidently put new life into our farmers and they have achieved the success this year that was certainly unexpected. This together with the results that will necessarily follow the application of what they have learned from the survey and contact with the men who made it, is sure to result in untold benefits to these two little counties and I heartily congratulate you on your far-sightedness in coming to our rescue."

Many such letters have been received from interested people of the district.

After the survey was completed and the needs clearly pointed out with recommendations for certain lines of work to be taken up this year, district committees were appointed to take charge of each line of activity with the understanding that each committeeman was also to be demonstrator of the work of his committee, as well as the leader in the community.

A large number of photographs showing undesirable, as well as desirable conditions, with necessary data were collected and the whole story with committee reports, etc., was published in a bulletin<sup>1</sup> in sufficient numbers to put a copy in the hands of each family.

The material thus assembled will serve as a guide for the vocational work through schools, it will serve as suggestions for discussions at farmers' meetings, institutes, etc., and because of its local nature will be read with interest and appreciation by every farmer and his family in the district. This work serves as a broad, sound foundation on which to plan a program that will have for its goal the development to the highest possible point all the potential factors relating to the agriculture and rural life of the district.

The chairman introduced the Assistant Secretary of Agriculture, Dr. C. W. Pugsley, who spoke as follows:

#### ADDRESS OF THE ASSISTANT SECRETARY OF AGRICULTURE,

#### DR. C. W. PUGSLEY

I think you are very kind, Mr. Chairman, to say that I have an important message. When your Executive Committee telegraphed me, I said I feared I had no message. I suspect, however, that you may be interested in a progress report on the reorganization of the Office of Extension Work that was put into effect last year. You people out in the States know more about how it is working at your end than we do. We are quite pleased with the progress that has been made in the Washington office. You will recall that at the New Orleans meeting, we determined upon the creation of three divisions in the Office of Extension Work, one a Projects Division, another the Division of Subject-matter Specialists, and a third the Division of Organization Specialists. After we had allocated the forces of the two extension offices, North and South, it became very evident that the two groups of specialists had overlapping programs, and that in order to be

<sup>1</sup> Indiana Extension Bul. 112, Agriculture in Ohio and Switzerland Counties.



most effective, they should work very closely together. For that reason, we combined the two groups into a Division of Methods. This, then, left but two groups, one a Projects or Programs Division and the other the Division of Methods. That simplified the problem, and is giving better coordination. Extension administrators really have but two things to consider, the first, *what* and *how much* to teach—in other words the program; the second, *how* to teach—in other words the methods to be used. These two items are necessary for any well balanced forward-looking agricultural program. I think all of the extension directors have received a chart showing the reorganization as it is now in effect. In order that all of you may see this, I am inserting two charts in this article, the first (Fig. 1) showing the extension organization of the States Relations Service as it was, and the second (Fig. 2) showing it as it is now.

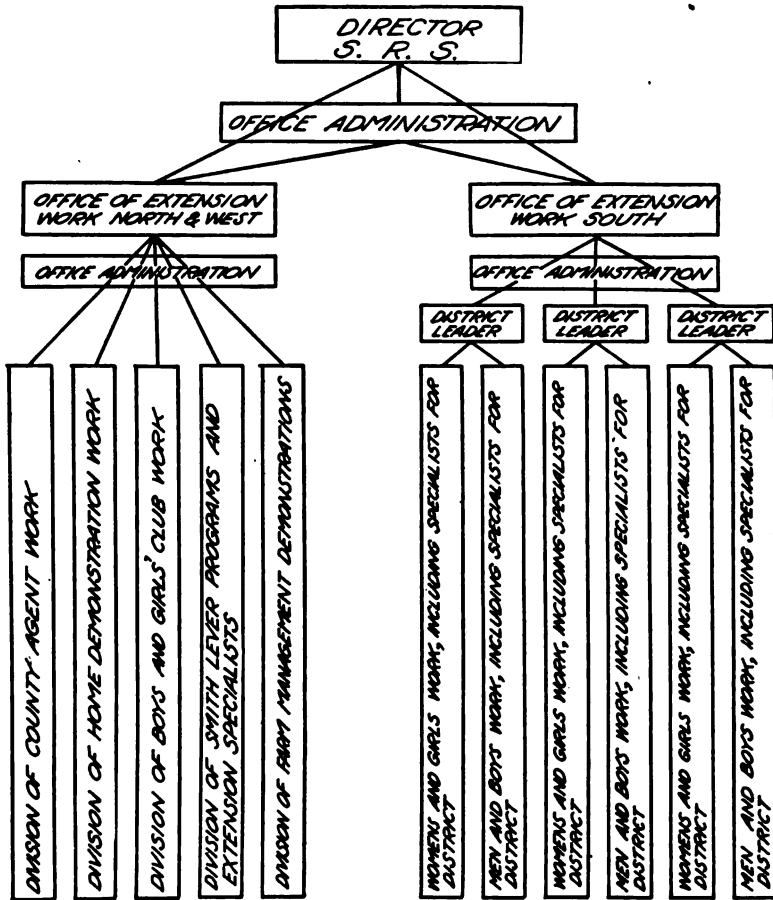


FIG. 1.—Organization of cooperative extension work prior to October 1, 1921.

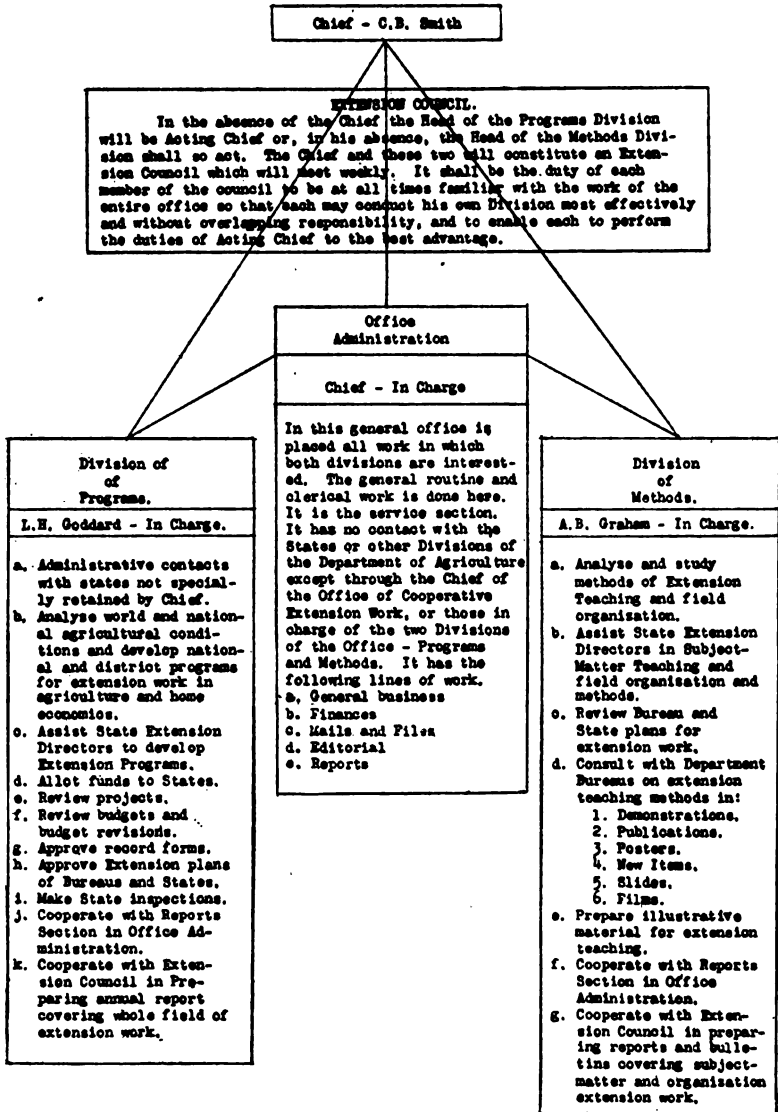


FIG. 2.—Present organization of cooperative extension work.

I want to speak of another reorganization that doesn't have to do with the Office of Extension Work. You are familiar enough with the Department of Agriculture to know that the Office of Extension Work is the one that administers the cooperative extension funds. There are other funds in the department which are being spent by bureaus and other work than that of the office of extension which has to do with extension. The Office of Motion Pictures and the Office of Exhibits are really extension

offices. The Secretary asked me to make a survey looking toward a reorganization of that work in order that there might be a closer coordination of all the work.

Most bureaus and offices in the department are doing three lines of work—research, extension, and regulatory. There are only these three lines of work in the department, speaking broadly. It is true there are some twilight zones in which it is hard to tell whether the work falls into research, regulatory, or extension, but if work is in these twilight zones it rapidly develops to a point where its place is clear. Two years ago, Congress created the offices of Director of Scientific Work and Director of Regulatory Work. It is their business to coordinate these lines of work now in the department under various boards, offices, and bureaus. But there was not established at that time a Director of Extension Work. It is the Secretary's opinion that extension work needs just as much coordination and direction as do the other two lines of work. The chart shown in Figure 3 shows clearly the need of such coordination. When Secretary Wallace asked the present Assistant Secretary to act as extension director he had in mind the need of some sort of reorganization which would do away with such an illogical administrative plan as that here shown.

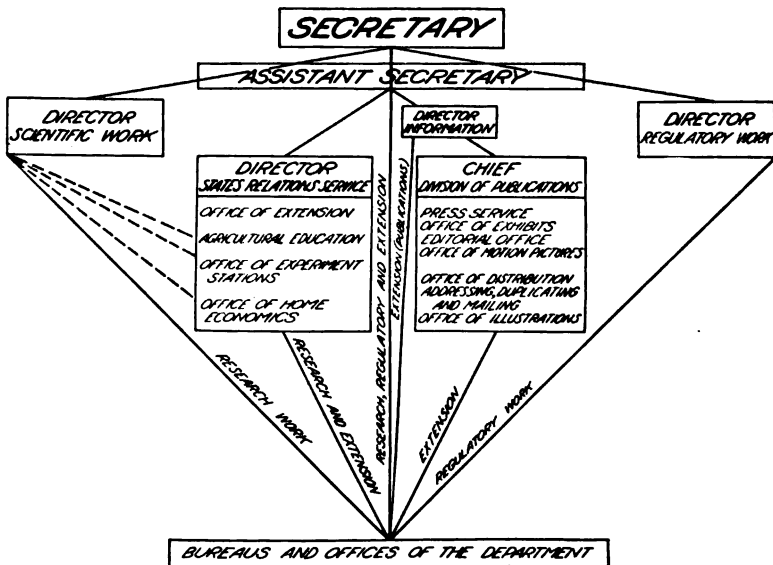


FIG. 3.—Present organization of the United States Department of Agriculture with special reference to extension work.

In the Department of Agriculture, there is but one Assistant Secretary. In some of the other Federal departments there are a number of assistant secretaries; the Post Office Department, for instance, has four, and they are assigned the different lines of work. They are not, however, in the classified civil service, and thus they change with the administration. That is true in certain other governmental departments. Assistant secretaries

should change with administrations, it seems to me. Presumably, a turn-over in elections means that the people in the United States are dissatisfied with something. At least, there is an indication that they expect to hold the new Chief Executive responsible for any change in affairs. Under our form of government, where the Secretary is a member of the Chief Executive's Cabinet and is held responsible for his department, those who are immediately responsible to him, in matters of administration, of course, must be people who have his viewpoint. But in a scientific and educational department like that of agriculture, the scientific, extension, and regulatory work is always with the department, and we do not want too abrupt changes there. So the Secretary feels that the three directors should be officers of a more permanent nature, responsible to the Secretary, of course, but serving to keep the work on an even keel.

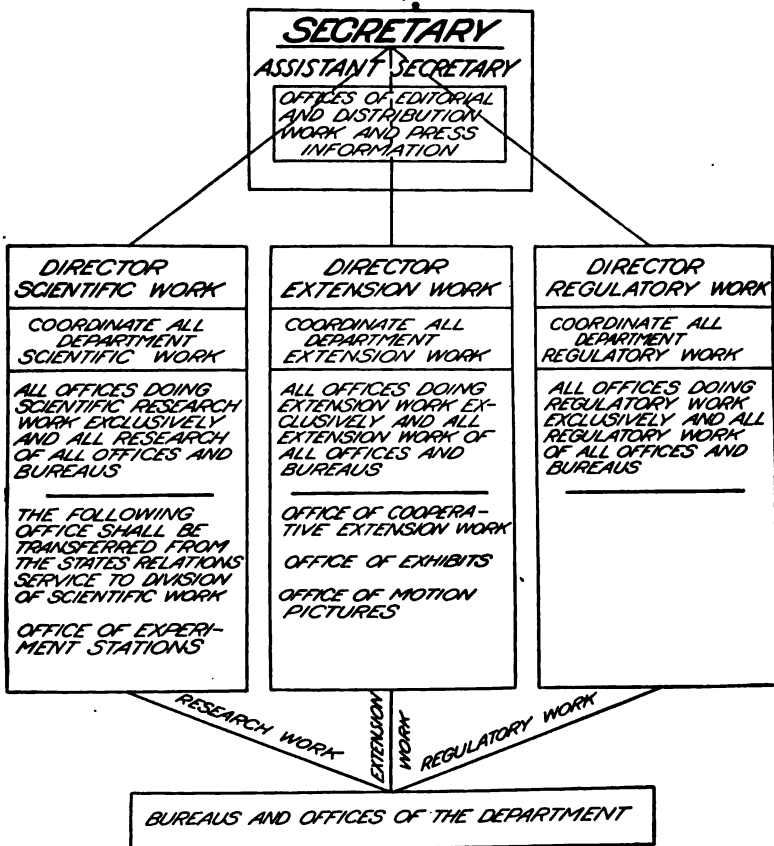


FIG. 4.—Proposed organization of the United States Department of Agriculture.

Figure 4 shows the proposed plan of reorganization. The Assistant Secretary becomes a closer part of the Secretary's Office. He is Acting Secretary when the Secretary is out of town, and he should necessarily

devote a considerable amount of time to that work. There are a large number of papers that have to be scrutinized by him. Within the department there are only three people who can act as secretary, when it comes to approving departmental policies. First, comes the Secretary himself, then the Assistant Secretary, and then the Chief of the Weather Bureau, who is the only other appointee of the President in the department.

You will note that the Division of Publications has charge of all of the editorial work of the department; likewise of the press work, the distribution work and those lines closely allied, such as mimeographing, etc. It also has charge of the motion pictures, which is extension work, and of the Office of Exhibits, which is extension. Another avenue is the extension agent work. The things that are taught through these avenues should be closely coordinated.

I do not know that this is true, but I suspect that if we had the actual figures, we would find that a large percentage of the motion pictures made by the Department of Agriculture are actually shown either by, or under the supervision of, the extension agents out in the counties—by the county agricultural agent, the home demonstration agent, or the club agent. Therefore, I maintain that the motion pictures should always have some direction and criticism from the force of people who are administering that work. I am also certain that, since the motion pictures made in the Department of Agriculture are used by you people out in the States more than they are by our own people, we should have some sort of a system by which we can get your suggestions on the motion pictures before they are put in final form, especially when they are to be used locally. We are attempting to work this out, and if the reorganization goes through, I think we will do this by next year.

When the States Relations Service was organized, it was intended that all of the work that had to do with State colleges of agriculture should be placed there. In addition to the Office of Extension Work, there is in the States Relations Service the Division of Agricultural Education, which has to do with teaching teachers of agriculture, the Office of Experiment Stations, and the Office of Home Economics.

After the Secretary had asked the Assistant Secretary to give particular attention to the extension work, all of the extension work was reported through the Assistant Secretary's office, the experiment station work through the Director of Scientific Work, and the home economics work through the Director of Scientific Work and the Assistant Secretary. The States Relations Service was required, therefore, to report part of its work to the Director of Scientific Work and part to the Assistant Secretary.

I find there are two lines of thought in the department and the agricultural colleges concerning editorial work. One is that all of the publications are in effect extension work, because they are extending the findings of the scientists to the people. But the truth of the matter is that the publications of the department are of three different types: (1) Those which deal with technical things and with methods of doing the work, and are of interest only to the scientific people and can not, therefore, be called extension publications in the broad and commonly accepted meaning of that word; (2) publications relating to regulatory work, of interest to the people who are administering regulatory work but not of interest to the

public; (3) extension publications, including all farmers' bulletins, some department bulletins, and certain other bulletins and circulars intended for general distribution or for restricted distribution with special reference to a particular problem. Because of the interests of the scientific workers in their topics and others in theirs, it seemed best to attach all of the editorial work and the distribution of bulletins to the Secretary's office. That is what we are asking for. We want an editor-in-chief at a salary which will be such as to enable the Secretary to secure a good competent man.

That would take out then, all of the work from the Division of Publications, except the Office of Motion Pictures and the Office of Exhibits. It is planned to place these two offices under Director of Extension Work. In addition, it is proposed to place under him the Office of Cooperative Extension Work which is now in the States Relations Service, with which you extension directors have been dealing.

These three offices are not offices of origin, in a sense; they are offices furnishing the avenues through which the other bureaus and offices of the department send their work out to the public. Any office which is placed directly under the Director of Extension Work should be an office of that kind—a part of the machinery of supervision.

Taking the Office of Cooperative Extension Work out of the States Relations Service, we have left in the service the Office of Experiment Stations and the Office of Home Economics. It is planned to put the Office of Experiment Stations under the Director of Scientific Work and to make the Office of Home Economics an independent bureau. It is also planned, if Congress approves, to secure a scientifically trained woman of administrative ability and experience to head that office.

Then that makes the chart thus: All of the extension work clears through the Director of Extension Work, all of the research work clears through the Director of Scientific Work, and all of the regulatory work clears through the Director of Regulatory Work. The Secretary himself and his Assistant must see that there is maintained a proper balance among the three.

I want to say a word about the Office of Exhibits and of the Office of Motion Pictures, with which you as extension people have not had as close contact as you should, and with which I hope you will have much closer contact. I am convinced that one of the most effective methods of teaching that can be employed by the extension agents is the motion picture, and for that reason we asked Congress last year to have erected a new laboratory for the motion picture workers. We think that within the next month or two our motion picture office will be housed in that laboratory. If any of you have any suggestions as to how we can work in closer cooperation with you in this motion picture work, we will be glad to have them. The same is true of the exhibit work.

There is prepared a large exhibit for the National Dairy Show and one for the International Livestock Exposition, as well as several for the State fairs circuits. During the past year a special effort has been made to prepare these exhibits so they could be used over and over again. We are limited in the preparation of exhibits to those for State and interstate fairs and expositions, and that prevents us from showing exhibits at smaller fairs or at various other places where we think they should be shown. There is no reason, however, why the exhibits can not be used elsewhere

after they have served their purpose at the larger fairs. Many colleges and localities are so using them. The reports that have come in are very gratifying. I would be glad to have you extension people make suggestions as to how exhibits can be prepared so that they will be of the greatest service to you in your work.

I want to touch briefly upon something which will be covered more in detail by the Secretary in his address this evening. The Department of Agriculture grew very rapidly after it was established. There are a large number of bureaus and offices within the department carrying large appropriations. In these various bureaus and offices under the appropriations act, we find a good many are doing work on the same commodity; I suspect that this is true in the agricultural colleges also. It seems to me to be very important that both the Department of Agriculture and the State agricultural colleges be certain that they agree upon the things to be taught. Before they reach the state where they can be agreed upon they are really not ready for the extension service. If there is any doubt within the minds of many investigators that is evidence that there should be more research work done in order to get the truth.

I can mention a few cases within the department where conflicting recommendations have been rather disconcerting to the States and embarrassing to us. To prevent this we have started commodity councils. The cotton council is an illustration. We have held about twelve meetings of this council. The first meeting was a mere going over of the ground—a visualization of the problem, if you please. Finally sub-committees were appointed on specific phases of the problem. Presumably, we have everybody within the Department of Agriculture studying cotton on these committees. If the question is as to a variety of cotton for a certain region, we naturally have the people within the Bureau of Plant Industry. Then there are others who deal with the various diseases of cotton as well as the troubles caused by attacks of certain insects. We call in people from the Bureau of Chemistry for consideration of the variety from the standpoint of oils, and from the Bureau of Animal Industry as to the value of certain byproducts of cotton for feed. We are asking the council first to agree, in so far as they can, upon those things which the Department can stand for in a cotton program for extension workers. Then after we are sure of those things, we plan to come to you in the south and ask where we are wrong. Cotton is larger than a State, but a State knows what part of a regional recommendation is applicable.

We hope to do that with a good many other subjects. The plan will be helpful within the department to more than the extension program. Already the bureau chiefs see where more work must be done and where there is need to relocate some of the work in order to better compare the results. There are a good many important things developing from the councils, in which you would be interested if I had time to tell you about them.

From the standpoint of extension work, it means a very great deal. In the development of motion pictures a commodity council will permit us to make every picture a department picture, for we can have it criticized by all interested bureaus in a short space of time. You know even the dairymen themselves are beginning to wonder if there is not a limit to the amount of effective dairy propaganda. They wonder if there is not a

point of saturation, so to speak. They are realizing that dairying as an industry must fit in with all other agricultural industries. In other words some feel that there is a possibility that it may be overdone. What is true of the dairy industry is true of every other industry. We need a balanced ration for our extension work as much as we need one for our livestock.

I noticed in the discussion this morning that very little was said about extension problems other than production and marketing problems. As administrators of extension work, it is increasingly necessary for us to recognize that we are responsible for the development of a complete extension program. We must not think of that program in terms of production alone, or of production and marketing alone, but we must think of it in terms of better agricultural communities and of better homes. I sometimes say that no agricultural program can stand up any better than a tripod, unless it is supported by the three fundamental legs. One of the legs of the agricultural tripod is economic production, another, economic distribution, and a third, the economic spending of the money which results from production and distribution. If any one of the legs fails, our agricultural program will collapse. I suspect we have not given sufficient attention to some of these things, particularly to the last named leg.

I would also like to say that we as administrators must remember that we have not only men, but women and juniors with whom we must work. We are responsible for reaching all rural dwellers because all must be reached if we develop a balanced program. As a part of that complete development we have the boys' and girls' club work and the women's work, and no extension director should forget, in determining methods of measuring the work, that the final object is the development of the better home and community life, rather than the growing of increased crops. Crops and marketing are but means to an end.

We can not separate the women's work from that of the men on the farm. There is a community of interest on the farm that you do not find in the city. The women on the farm help with the chores. They raise the poultry. In the farm life, the women know better than they do in the city the tremendous importance of conducting matters so that there is something left after the debts are paid. They have a keener observation of family economics than the city women have, because of the nature of their work. Most of you have been in farm homes in your extension work. If you will recall the conversations around tables at meal times or during the evenings, you will find more often than otherwise the entire family is talking of the money the crops will bring and it is to be spent for things which are needed in the home to make their lives happier, better, and fuller. It is necessary for us to give attention to the proper expenditure of the money. If we are to have the greatest development of those things which make country life worth while, we must get that message to the men as well as to the women and to the boys and girls. We can not do that except through a completely rounded and well balanced program made by all members of the family sitting together.

Let us not forget the boys and girls. I sometimes say that if I were given twenty years to put across a program that would improve agriculture in all of its phases, I would devote all my energies and spend all of the money on the boys and girls. Of course, that is not possible, nor even



advisable, but I am certain that some of the most effective work we can do is with the juniors. Such work not only educates the future farmer or farmer's wife at the most susceptible ages, but furnishes an effective avenue to the seniors, and the most effective from very many angles.

During this year, I have made a number of trips over the United States, and after each have realized that more trips are needed in order to get a national viewpoint of the extension problem. I hope to visit some sections that I have not visited before during the next year and to come in very close contact with the county extension workers. If you can add to my education, I wish you would let me know, and I will try to be with you.

The report of the Committee on Extension Organization and Policy was presented by the chairman of the committee, G. I. Christie, Director of Extension of Indiana, as follows:

#### REPORT OF COMMITTEE ON EXTENSION ORGANIZATION AND POLICY

##### REPORTS

As to reports to the States Relations Service on the work of cooperatively employed field agents, we find that it will be agreeable to submit to that service, in lieu of either the present monthly or quarterly narrative report, a plan of work instead, due April 1, showing the farm work to be undertaken, the home work and the work to be done through the agency of boys and girls in each county or district of the State during the year, and a final annual narrative and statistical report on such work in December of each year. These plans and final annual report should include, of course, the work of the cooperatively employed supervising officers of these lines of work.

This eliminates all monthly or quarterly narrative reports heretofore rendered, so far as the States Relations Service is concerned and centers attention on the plan of work for cooperatively employed agents at the beginning of the year, and statement of results at the end of the year.

We commend the attempt of the States Relations Service to formulate a consolidated county report. Such a report will do much to emphasize important lines of work, to summarize the results and unify the activities. The form as submitted should be modified, in some particulars, in order to meet the needs of some of the lines of work. It is urged that the report on home project work should be emphasized in a larger way and be given more prominence.

It is recommended that the chairman of the Section of Extension Work, together with two additional members to be appointed by him, shall serve as a committee to cooperate with the States Relations Service in this matter.

##### CONFERENCE OF EXTENSION WORKERS

The subject of conferences for extension workers for the next year has been given consideration by your committee. From information we have secured, there is no urgent need, nor any expressed desire on the part of the States Relations Service or extension directors for another national conference of administrative officers this year. Requests have been made for regional conferences as follows:

(1) The extension directors and other administrative workers of the Western States propose to hold a conference at Denver or Colorado Springs during January or February. They also wish to hold conferences on range problems, livestock production, the dairy industry, and food and nutrition.

(2) Southern directors propose to hold a conference of administrative officers of the Southern States at Montgomery, Alabama, January 16 and 17, following a conference of the negro extension workers, which they propose to hold at Tuskegee, Alabama, January 13, 14, and 15.

(3) The directors of the Eastern States propose a conference of directors and representatives of forestry, junior extension, and vegetable gardening at New Haven, Connecticut, the last week in February.

(4) The directors of the Central States propose a regional meeting of farm management and demonstrators and a conference on home problems the first part of May in Chicago.

#### HOME IMPROVEMENT WORK

The farm home is the essential factor in maintaining a wholesome country life. Since the ultimate aim of extension work is in improvement of rural life, of which the home is the center, we recognize the improvement of the home and family life as an essential part of a well-rounded extension program.

Therefore, we, the extension directors, believe that if the people are to receive the maximum benefit from the extension service, the home demonstration work should be strongly emphasized, and submit the following for consideration:

(1) We consider the home demonstration agent an essential factor in carrying forward a well-rounded extension program.

(2) We recommend that as large an allotment of extension funds as possible be set aside for the development of full time home demonstration work in the counties.

(3) When the lack of funds prevents the employment of full time home demonstration agents in each county, we recommend that work in rural homes be promoted by means of specialists to the end that the value of the work may be demonstrated in every community possible.

(4) We recommend that in the compilation and publication of reports of extension work, special prominence be given to the results accomplished in the improvement of the rural home.

(5) We express our appreciation of the support given the extension program in agriculture and home economics by the organized women of the nation, both rural and urban, and urge its continuance.

#### RELATIONSHIP OF EXTENSION WORKERS TO AGRICULTURAL ORGANIZATIONS

At the request of the Executive Committee of the association, the Committee on Extension Organization and Policy has given consideration to the proper scope of extension work in agriculture and home economics and the relation of extension workers to agricultural organizations. During the past few weeks letters have been sent to extension directors, asking for information on the relationship between extension organizations and county and state agricultural organizations. The replies have been considered by your committee and used in formulating this report.

## STATEMENT OF SECRETARY OF AGRICULTURE

Under date of August 25, 1922, the Honorable Secretary of Agriculture issued a statement concerning the relation of Federal cooperative extension employees to agricultural organizations. This statement set forth clearly and forcefully the duties of extension workers and their relation to agricultural organizations. The letters received from agricultural extension directors indicate unanimous approval of the policy enunciated. It is felt that this statement has done much to give a clearer view of the field of extension workers.

STATEMENT OF THE SECRETARY OF AGRICULTURE CONCERNING THE RELATION OF  
FEDERAL COOPERATIVE EXTENSION EMPLOYEES TO AGRICULTURAL  
ORGANIZATIONS

The Act of Congress approved May 8, 1914, and supplemental acts thereto, established cooperative agricultural extension work between the Federal Department of Agriculture and State agricultural colleges. Section 2 of that Act defines the work as follows:

"Sec. 2. That cooperative agricultural extension work shall consist of the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or resident in said colleges in the several communities, and imparting to such persons information on said subjects through field demonstrations, publications, and otherwise; and this work shall be carried on in such manner as may be mutually agreed upon by the Secretary of Agriculture and the State agricultural college or colleges receiving the benefits of this act."

It is thus made clear that the work of the cooperative extension employees, whether county agents, home demonstration agents, boys' and girls' club agents, or other cooperative extension workers, is educational. These extension workers are public teachers paid with money largely raised from all of the people by taxation and are charged with giving instruction and practical demonstrations in agriculture and home economics. Their work covers the entire rural field, which includes economic production, economic marketing, and the development of better home, community and social conditions.

As they are public teachers, it is not a part of the official duties of extension agents to perform for individual farmers or for organizations the actual operations of production, marketing, or the various activities necessary to the proper conduct of business or social organizations. They may not properly act as organizers for farmers' associations; conduct membership campaigns; solicit membership; edit organization publications; manage cooperative business enterprises; engage in commercial activities; act as financial or business agents, nor take part in any of the work of farmers' organizations, or of an individual farmer, which is outside of their duties as defined by the law and by the approved projects governing their work. They are expected, however, to make available to organizations such information as will be helpful to them and contribute to the success of their work.

The various Federal laws provide that cooperative extension work shall be conducted in such manner as shall be mutually agreed upon by the Secretary of Agriculture and the State agriculture colleges. By an agreement between these agencies an extension director located in each State is the representative of both the college and the Department. He submits projects for extension work to the Secretary for approval.

In carrying out these projects the law provides that no Federal Smith-Lever money, except \$10,000 per State shall be paid to the States for cooperative extension work until

" \* \* an equal sum has been appropriated for that year by the legislature of such State, or provided by State, county, college, local authority, or

individual contributions from within the State, for the maintenance of the cooperative agricultural extension work provided for in this act."

Under a later act provision was made that  
 " \* \* moneys contributed from such outside sources \* \* shall be paid only through the Secretary of Agriculture or through State, county or municipal agencies, or local farm bureaus or like organizations, cooperating for the purpose with the Secretary of Agriculture."

This makes it very clear that the law contemplates cooperation with farmers' organizations willing to cooperate in the work with which the cooperative extension agent is charged. It is the duty of the extension agents to render such assistance whenever possible in his teaching capacity to any agricultural organizations desiring it. Furthermore, the work of these extension agents can be the most effective where it is carried on with organized groups of rural people. It is entirely proper for any agricultural organization desiring to cooperate financially in the work of the extension agents to contribute funds for the support of such work, and these funds may be accepted legally by the extension service of the agricultural colleges and by the Federal Government for work on approved projects.

In short, it is the business of the extension agent to cooperate with all agricultural organizations which desire to cooperate on approved projects. If more than one organization exists in a county he must cooperate with all fairly and impartially in the educational work in which they are mutually interested.

The Department of Agriculture must necessarily consider in its administration of Federal cooperative extension funds the laws which have been passed by the various State legislatures in accepting these funds and under which agreements have been made with those States for conducting this work. If special provisions relating to the methods of cooperation with agricultural organizations of other agencies are contained in the State laws, which do not conflict with the Federal laws, it is clearly the duty of the Secretary of Agriculture to accept such provisions in a cooperative project.

HENRY C. WALLACE,  
 Secretary of Agriculture.

August 25, 1922.

#### SCOPE OF EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS

Extension work in agriculture and home economics in all the States is conducted under the provisions of the Smith-Lever Act. Section 2 of that act defines the work as follows:

"That cooperative agricultural extension work shall consist of the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or resident in said colleges in the several communities, and imparting to such persons information on said subjects through field demonstrations, publications, and otherwise; and this work shall be carried on in such manner as may be mutually agreed upon by the Secretary of Agriculture and the State agricultural college or colleges receiving the benefits of this Act."

The wording and meaning of the above section is clear and definite. The work of county agents, home demonstration agents, boys' and girls' club agents, specialists and other extension employees is strictly educational, since the act provides for the giving of instruction and practical demonstrations. The Smith-Lever Act contemplated a broad and comprehensive work which covers all farm and home problems, including economic production, economic marketing, and the development of better home, community, and social conditions.

#### DUTIES OF EXTENSION WORKERS

Extension workers, including county agents, home demonstration agents, boys' and girls' club agents, specialists, and other workers, are representatives of the State agricultural colleges and United States Department of Agriculture and should use their time and efforts in giving helpful information to the people of the various communities. These field agents are expected to carry the work of research departments to the people on the farm and in the home. They are expected to give information on marketing, as well as production. They should give information on co-operative enterprises and are within their field when they give information on methods of organizing to carrying out the desired projects. On the other hand, the extension agents are not authorized and should not perform for individual farmers or for organizations the actual operations of production, marketing, or the various activities necessary to the proper conduct of business or social organizations. They should not act as organizers of farmers' associations; conduct membership campaigns; solicit membership; edit organization publications; manage co-operative business enterprises; engage in commercial activities; act as financial or business agents, nor take part in any of the work of farmers' organizations or of an individual farmer, which is outside their duties as defined by the law and by the approved projects governing the work.

#### RELATION OF EXTENSION WORKERS TO ORGANIZATION

In order that extension workers may reach and assist the largest number of people, it is necessary for them to cooperate with organized groups of farmers and home-makers. Lack of funds and workers make it impossible to carry on projects with individuals. It is necessary, therefore, in the counties and communities, to have strong interested organizations with which to work effectively. In some States more than one agricultural organization exists. Where these organizations are interested in extension projects and are in a position to assist in the work, extension workers should give all possible cooperation, and render impartial service. It is recognized that extension workers are public officials paid from public funds, and should use their efforts in work of benefit to all. The best extension work is secured where all active and interested agencies are enlisted in the extension program.

The report was discussed by sections, adopted, and referred to the Executive Body. (See pp. 367-368.)

#### ELECTION OF OFFICERS

The following were elected officers of the sub-section for the ensuing year: Chairman, C. F. Monroe, Director of Extension of New Mexico; secretary, H. C. Ramsower, Director of Extension of Ohio.

WEDNESDAY AFTERNOON, NOVEMBER 22, 1922

This was a joint session of all sub-divisions of the Section of Agriculture, but dealt exclusively with matters pertaining to extension.

B. W. Kilgore of North Carolina, chairman of the Section of Agriculture, presided.

The first paper was presented by Dick J. Crosby, Professor of Extension Teaching, New York State College of Agriculture, as follows:

#### THE TRAINING OF EXTENSION WORKERS

BY DICK J. CROSBY

The training of extension workers is too broad a subject to treat adequately in twenty minutes. I am, therefore, taking the liberty of omitting any discussion of the training of extension specialists or of that other large and little understood group of extension workers known as project leaders, in order that I may discuss a little more fully the training of county agents. I shall speak of them as county agents but I shall be thinking all the time, not only of county agricultural agents, but of home demonstration agents and club agents as well.

When one contemplates the training of full-grown men and women it is usually well to consult both the trainers and the trainees. In the case of dogs, parrots, and ponies, this procedure is not always followed, but in this case I thought it safest to fortify myself with as many opinions as I could get in a relatively brief time. I, therefore, began by sending one-page letters, each with a few pertinent questions on it, to the forty-eight extension directors.

#### OPINIONS OF EXTENSION DIRECTORS

Forty of the directors sent wholly satisfactory and reasonably prompt replies from which we shall be able to draw some very significant conclusions. The first of these questions and a summary of the replies to it are as follows:

(1) Do county agents need professional training in addition to thorough technical training in agricultural subjects?

Eighty percent of the replies to this question were affirmative and 12.5 percent were negative. Three directors did not answer the question. The opinions of directors seem to be overwhelmingly in favor of professional training, but the evidence is modified somewhat by the replies to the second question.

(2) If the answer to (1) is affirmative, mention (a) subjects that in no case should be omitted and (b) subjects advisable for them to take.

Since practically all of the subjects mentioned by extension directors were included under (a), subjects that in no case should be omitted, I have charted them all together in the following diagram:

## STUDIES SUGGESTED BY EXTENSION DIRECTORS FOR BETTER TRAINING OF COUNTY AGENTS

Figures show number of Directors mentioning each Study

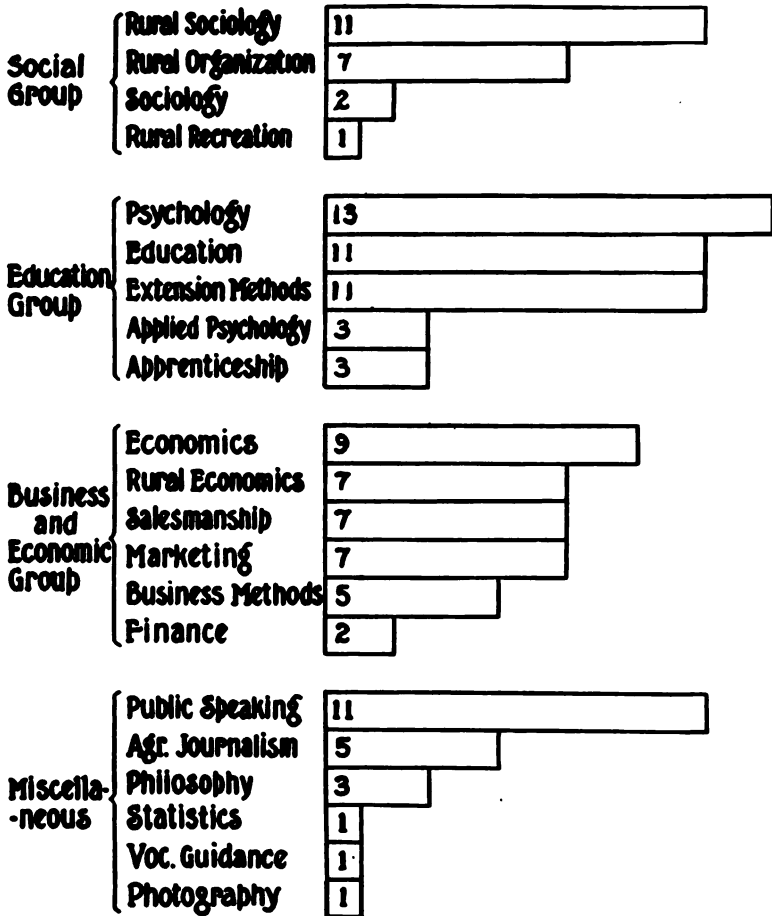


FIG. 1.—Studies for training county agents.

This chart shows that there is still some confusion as to what is technical training and what is professional. For example, such studies as rural economics (including farm management and marketing), rural sociology, and rural organization have commonly been included as branches of technical agriculture and are so regarded by our standing committee on instruction in agriculture, home economics, and mechanic arts. Moreover, such studies as philosophy, finance, statistics and public speaking have not been included in either category. But this matter of classification of studies is of little concern to us at this time. The two important things

are (1) that the subjects mentioned are the ones that directors think county agents need, and (2) that directors are coming to recognize studies in education as a necessary part of the equipment of county agents.

No other interpretation can be put upon the replies to our first two questions than this: That extension directors believe that county agents would be better equipped for their work if they had better training in rural social organization, in rural economics and business methods, in oral and written expression (public speaking and agricultural journalism), and in professional subjects in education, including methods in extension teaching.

Our belief that professional training holds a high place in the regard of extension workers is further supported by a study recently made by E. A. Miller of the States Relations Service, who sent a letter to the supervising forces in extension work in the fifteen Southern States, asking a question to this effect: If you had the privilege of delivering a series of ten lectures to a group of prospective county agents, what ten subjects would you select? Miller records the fact that more than fifty replies were received and they were surprisingly uniform. He has classified the replies and his classification contain 75 entries relating to the professional improvement of county agents and only seven relating to his technical improvement in matters relating to production, soil management, and marketing. To an overwhelming extent, therefore, these county agent leaders were thinking of the need of supplementing the existing technical courses in agricultural colleges with something relating to the history, development, ethics, and methods of county agent work, and this with related fundamental courses in education is what we like to think of as professional training.

So much for the opinions of extension directors and county agent leaders. Now, what do the county agents themselves think of the matter? Do they believe in special training, and if so what studies should contribute to it?

#### OPINIONS OF COUNTY AGENTS

In 1920, committees of county agent leaders sent questionnaires to all county agricultural agents to get their opinions "relative to the desirability of special courses to fit men for county agent work." There were 1,414 replies to this letter, 790 of them from the North and West and 624 from the South. Of these, 90 percent were in favor of some special provision for the training of county agents, of whom nearly 64 percent were in favor of modified undergraduate curricula, and 36 percent thought post-graduate training preferable. Only 1.3 percent of the 1,414 expressed the opinion that no special college training was needed for county agent work. Summer practice in a position as assistant to a good county agent, supplemented by a thesis on the work, was favored as a part of such curricula by about 40 percent of agents and opposed by 1.5 percent. The vote on the advisability of land-grant colleges establishing departments for the training of extension workers was 74 percent for and 7 percent against.

The studies mentioned by county agents as needed in an extension curriculum were many of them identical with those mentioned by extension directors. The business and economics group led in number of times men-



tioned, with marketing mentioned 1,060 times, business administration 1,058, and economics 101.

Next in demand came self-expression with public speaking mentioned 988 times, journalism 843, and English 21. Third in order was the education group, with extension organization 958, and psychology 757. Among other subjects mentioned were photography with 377 votes, sociology and rural sociology with 53 and salesmanship with 35.

Again our conclusion must be that county agents need better training and special training, or at least they think they need it. They point out this fact in their large vote for graduate work and in their mention of studies needed, which latter are not primarily technical in the usual sense of the term, but professional in their close relation to the functions of county agents as teachers and rural organization leaders.

#### COUNTY AGENTS EFFICIENT

I would not have you think that I regard the county agents as a poorly trained, inefficient group of workers. They are quite the opposite. Many of the extension directors think that they are not as well-trained in professional subjects as the Smith-Hughes teachers, but these same directors maintain, and we agree with them, that in technical training, personality, experience and devotion to service they are the peers of any educational group ever employed anywhere. Nearly 82 percent of them are college graduates in agriculture or in home economics and many of the remainder have college or normal school training.

But the quality of work they have done and are doing has had such a stimulating reaction upon their constituents that they themselves realize and their directors and leaders realize that nothing short of the best of training will satisfy and there is a feeling that even those who have had four years of college work might do better with a little more or a little different training.

#### COUNTY AGENT WORK CHANGING

As experience in county agent work is gained the point of view is slowly shifting. The county agents of today are not so much farm and home advisers or prescription pharmacists as were the agents of 10 or even 5 years ago. More and more they are becoming educational psychologists and teachers who analyze, home and farm and community problems and then teach principles that will enable their people largely to work out their own problems. They are finding that with responsibility for a county upon their shoulders, they have but little time to sit on the other end of a log with their pupils, but like twentieth century teachers must deal with them in groups of leaders and then set the individual members of these groups to work among other groups.

Fundamentally all extension workers are teachers—a peculiar kind of teachers who go to the pupils instead of requiring the pupils to come to them; who do not examine and grade and mark their pupils, but are themselves graded and marked by their pupils and their supervisors; who have no authority to compel attendance except by the compelling quality of their teaching—very peculiar, *but they must be good teachers.*

And the county agent species of teachers are even more peculiar than the specialists—they must be business managers, social organizers and publicists, as well as teachers. They need, therefore, all the help they can get from the field of education—all that educational psychology and principles of teaching can give them, plus all the help they can get from newly developing fields of rural organization and agricultural journalism.

The problem as it presents itself to the colleges in this association has two main phases: (1) That of preparing prospective county agents and (2) that of giving additional training to those now in service.

#### PREPARING PROSPECTIVE COUNTY AGENTS

The problem of preparing prospective county agents, so far as a college can give such preparation, is not very difficult of solution, except in the case of students who wish to pursue graduate work. The extension directors, the county agent leaders, and the agents themselves, in the studies I have just referred to, have practically mapped out the curriculum for us. It should provide, as the speaker pointed out at the Springfield convention of this association in 1920: "(1) A good broad educational foundation, (2) technical training in the vocation of the people with whom he is to deal—in agriculture or in home-making, with added emphasis on the vocational phase of his choosing, e. g., animal husbandry or nutrition, (3) professional training in education, with emphasis in his particular field."

I would not change these recommendations at the present time, except possibly to explain them and change slightly the emphasis. I believe that in many of the land-grant colleges the tendency is to over-emphasize the technical work in agriculture and home economics, especially for those who do not expect to practice in specialized technical vocations, and county agents certainly can not be expected to be specialists. For prospective county agents some of the time now devoted to specialization in technical studies might well be given to studies in agricultural economics and English, especially composition, public speaking, and journalism. If rural sociology (or rural organization, or rural social science) is taught, a basic course in this subject should be included. Every land-grant college is now offering courses in educational psychology and in principles of teaching, and a course or courses in these two subject should be the minimum in education for prospective county agents.

Finally, there should be at least one strictly professional course in extension, which at the present stage of development will probably include an outline of the history of extension work, and a discussion of extension organization, policies, and methods. It should be developed, organized and taught by men and women who have had long and successful experience in extension work, preferably administrative work, who are familiar with its history, who are now in close touch with all phases of the work, who are teachers, and who have arrived at a sound philosophy as to its present and future significance.

In New York we advise with those of our students who think they want to prepare for extension and we think that this practice should be followed to a much greater extent than is now possible. Needless to say that we sometimes advise a student not to look forward to county agent

work. As an aid to student advisers we have prepared a mimeographed leaflet pointing out some of the opportunities that our college offers for students to prepare for extension work. In this leaflet we make the following statement:

"Students who wish to prepare for extension work in agriculture along such lines as extension administration or county agent work should first select studies that will give them broad general training in agriculture and related chemical, physical, biological, economic, and social sciences. They should also have some work in educational psychology and principles of teaching and at least one course dealing specifically with extension methods, organization and policy. Such time as then remains, to the extent of eight to twelve hours, may well be devoted to elective courses in psychology, economics, public speaking, political science, rural education, rural social science, and history of agriculture."

We also give them an outline of recommended studies which include (1) required subjects in English, 6 hours; an orientation course for freshmen, 1 hour; and required electives in science, including not only fundamental physical and biological sciences, but additional sciences, such as mathematics, psychology, political science, government, and public law, 38 hours, or a total of 45 hours of required courses; (2) recommended electives, including 35 hours in productive agriculture, 15 hours in rural economics and rural social organization, 4 hours in education, and 9 hours in extension teaching, a total for this group of 63 hours, and (3) recommended alternatives, such for example as a choice between two courses in economics, or between plant breeding and animal breeding, a total for this group of 18 hours, or a grand total of 121 semester hours. Our requirement for graduation is 120 semester hours, but many of our better students complete 125 to 130 hours, and it is from these better students that most of our county agent material comes.

Our professional courses in extension include a 2-hour course entitled Extension Methods, Organization, and Policy, for seniors and graduates, a 3-hour course in Extension Home Economics, and a seminar course in Home Economics. Several other courses are listed as extension courses because they are taught by members of the department of extension teaching, viz.: Oral Self-expression, 4 hours; Agricultural Journalism, 3 hours; Agricultural News Writing, 4 hours; The Country Newspaper, 2 hours; and Agricultural Information Service, 2 hours.

#### GRADUATE STUDY

We believe that graduate study or a fifth year devoted partly to professional study at the college and partly to supervised field practice is a thing we shall need to plan definitely for in the near future. The problem is definitely before us at Cornell. We now have at least six graduate students who expect to engage in extension work. One of our difficulties is to obtain recognition in the graduate school for problems having any taint of professionalism or of usefulness. I understand that we are by no means alone in our troubles.

We do not think it likely that many of the county agents now in service will give up their jobs to take an advanced degree, but a few of them may. Extension specialists, on the other hand, feel a real need for advanced study. Many of them now have master's degrees and some the

doctorate. They should be as well trained in all respects as the resident teaching staff. But whether the demand be small or large, the land-grant colleges that have strong graduate schools or departments should recognize their obligations in this respect and encourage these teachers and these molders of progressive public thought to seek such assistance as colleges can give toward clarifying their own thinking on important social and economic issues.

#### TRAINING FOR AGENTS NOW IN SERVICE

We have just expressed the opinion that not many of the county agents would feel like giving up their jobs to return to college for graduate work. If all of those who feel the need of more advanced study or of broader training in education, economics and sociology were so situated as to make return to college easy or practicable, there would be no serious institutional problem in this matter, but this is not the case. If help is to be given it must be done in some other way.

Thus far California offers the only suggestion that has come to the speaker's attention. In this connection Crocheron writes as follows:

"I believe that the additional training which is desirable for all county agents may best be given during their term of employment, by making it possible for them to attend frequent professional conferences, to take short courses in pedagogy, philosophy, psychology, sociology, and economics, and through the opening to them of sabbatic leave whereby an entire additional year of professional training may be secured. We have the latter system in vogue and encourage our men to take short courses whenever possible."

This plan involves the employment by the central offices of itinerant assistant county agents who can replace county agents when absent for study. It might not work equally well in States where local organizations have something to say regarding the employment or supervision of county agents, but we are inclined to believe that most people desire to be reasonable and that a county agent who based his or her request on good reasons would have little difficulty in arranging leave for study, if a fairly good substitute were available. Frankly the plan appeals to me and I should like to see it given a fair trial.

#### SUMMARY

In conclusion permit me to say:

(1) That the primary functions of the county agents are educational in character—the Secretary of Agriculture has expressed his opinion to this effect, and in this view he has abundant support.

(2) The directors of extension believe that county agents need professional training and in specifying studies needed in this connection have mentioned professional studies in education more frequently than any others. Furthermore, 90 percent of the subjects mentioned by 50 of the supervisors of county agent work in the South were related to professional improvement.

(3) Ninety percent of county agents who expressed opinions believe in specialized training for their positions and give psychology and subjects in education a large part in the program.

(4) It is the plain duty of the land-grant colleges to meet every demand, so far as they are able to do so, for the better preparation of candidates for county agent positions. These colleges now have facilities for training vocational teachers, which facilities they should make available to prospective agents. To this end they should plan curricula that will embrace their available basic courses in rural economics, rural social science, and professional studies, including at least one course dealing with extension organization, policies and methods.

(5) All of the colleges should consider plans for the professional improvement of agents now in service—preferably plans that will enable them to get entirely away from their counties for periods of several weeks or months to study.

(6) A few of the colleges that offer graduate work in rural education, rural economics, and rural sociology should give serious attention to the development of graduate work that will attract extension workers and encourage some of them to make thorough and scholarly study of the problems of extension teaching.

The following paper was presented by H. J. C. Umberger, Director of Extension of Kansas:

#### THE FIELD OF THE EXTENSION SPECIALIST.

BY H. J. C. UMBERGER

The first extension work was done by teachers and investigators, who gave a part of their time for the purpose of meeting and teaching those people living remote from the college. Extension as a distinct method of education came about because those who first undertook it, primarily resident teachers and investigators, found it took them from their chosen fields, and they welcomed a release from these demands upon their time. Its development was strengthened by the knowledge that there must be created some systematic method of moving the constantly accumulating subject matter at the college to those to whom it was valuable.

#### SPECIALIZATION IN RESIDENT TEACHING AND INVESTIGATION

In the beginning, when extension work was done by resident teachers and investigators, it was more or less general in character. Two dominating influences have materially affected its development: Growth of specialization in subject matter teaching and increased utilization of extension methods.

In resident teaching, however, specialization was progressing in many institutions when extension assumed its present identity, resulting in an increasing number of graduates of these courses in every community following their specialty as practical farmers. Not only do these graduates have extensive fundamental training, but by means of bulletins, circulars, correspondence, and personal visits to the college, as well as through farm papers, they are enabled to maintain a high degree of theoretical knowledge, which is constantly supplemented by practical experience. Because of their superior attainments in their specialties, both theoretically and practically, they are usually leaders in their communities. Any educational

agency, to maintain a leadership in these communities, must possess a knowledge superior to that of these local leaders. This fact requires a degree of specialization on the part of the educational agency.

The importance of thus specializing was not fully realized even at the time of the enactment of the Smith-Lever law. In the discussion relating to this law, a hope was expressed that its enactment would result in a local agent in every county. That he was expected by extension agencies to be an authority on all agricultural subjects is indicated by the fact that the term, farm adviser, was at first applied to him. This term was in disfavor with some at that time, not because it did not describe the true function of the agent, but because of the psychological effect it would have on the farmers if a person were placed in their community under a name which implied that he was able to teach them more than they themselves knew about their own business. This name is no longer in general use, because it does not truly designate the function of the agent.

The Smith-Lever Act resulted in a large increase in the number of local agents. As their number increased, it became apparent that subject matter was not the only essential required for the accomplishment of results, but that much depended on methods of extension teaching.

#### DEVELOPMENT IN METHODS OF EXTENSION TEACHING

In the beginning, extension work was done by means of meetings, called incidentally, and not supported by any local cooperation. Later these meetings were held in connection with special organizations, such as breeders' associations and agricultural societies, finally resulting in a very general method of doing extension work under the system known as farmers' institutes. Because of a tendency on the part of the farmers to feel that there was much difference between talking matters over in meetings and trying them out under actual field conditions, there developed the demonstration method. Since this involved the performing of a distinct educational process on the individual farm and came into existence coincidentally with the establishment of the local agent in the community, it was difficult for farmers, as well as many extension workers, to differentiate between education and mere personal service. One of the first so-called demonstrations I happened to see put on by a county agent consisted of his pruning all the trees in an entire orchard for a farmer. While the agent was demonstrating a method of pruning, the farmer was showing me around his place, and learned nothing from the county agent's work. The educational features of the demonstration were lost, except that the orchard remained in the community as an example of the efficiency of modern methods.

Ultimately the principle was evolved that it was the business of extension to incorporate theoretical information into the practical knowledge of the community, and to teach people to perform these services for themselves. Thus the demonstration came to be conducted, not as a mere job, as in the illustration given, but for purpose of calling together those interested in certain information, putting on a demonstration for their benefit, and encouraging them to perform the operation themselves until they became thoroughly proficient.

Thus experience developed the effectiveness of calling group meetings and demonstrating not to one but to many, and group instruction by means of demonstrations became a regularly established practice. This then resulted in a general organization of those interested in educational programs, usually known as farm bureaus. These furnished a local background of support for efforts in group instruction.

There naturally came into existence a responsibility of teaching what some term community consciousness. It became a part of the duties of the county agent to teach his community to assume responsibility, not only in determining its own programs but in carrying them out, once they were adopted, and performing the local functions incident to such an educational program. This was followed by grouping those interested in special subjects. Thus were formed farm bureau committees, each consisting of farmers specially interested in particular enterprises, as the growing of pure seed, horticulture, or beef production. It is reasonable to suppose that in forming these committees, those persons possessing more than average information along these lines should be given the leadership, and this class of men we have come to recognize as a component part of our rural organizations, designating them local leaders. They represent a degree of attainment in information even superior to that of the county agent.

#### DEVIATION OF COUNTY AGENT FROM SUBJECT MATTER TO METHODS

Because of the continuous contact of the county agent with the community, the responsibility for the development of methods of extension has largely been imposed on him. So great have become the demands for this type of work that some of the most far-seeing among county agents and extension agencies are even now beginning to express the feeling that the agent's particular function is, in a measure, that of a method specialist. This deviation of the county agent from subject matter teaching to methods has resulted not so much from the efforts of those supervising extension as from public demand. A county agent is directly subject to the influence of his community. His success in extension organization often led to a demand that he engage in buying and selling and other activities entirely outside his legitimate field as an educational agency. It has required constant vigilance to confine him to educational activities.

Since this development is the outcome of experience, it would seem to be a logical one. The most successful extension work is done where the county agent is capable of maintaining a well established organization, which can effect a systematic method of procedure. Naturally as the responsibility of the agent increases in this field, it does so at a sacrifice of his subject matter. This fact brings an increasing need for an agency whose first duty is the effective teaching of subject matter, and this need is filled by the extension specialist.

On account of the increasing specialization in resident teaching, resulting in better trained farmers who demand more specific information, and because requirements of county agents are as various as the types of farming, as well as the increasing complexity of methods necessitating time-consuming thought and effort, we have been compelled to modify the original idea that the county agent would be entirely a subject-matter teacher.

RELATIONSHIP OF THE COUNTY AGENT AND SPECIALIST TO GENERAL AND SPECIFIC  
METHODS OF PROCEDURE

As our educational program progresses, local organization, as it affects extension methods, will become the work of the county agent; in fact, this is even now definitely recognized by the employment of extension specialists, whose responsibility is first toward subject matter and second toward methods. It will be logical to assume that, as the county agent is in a position to accumulate and classify the educational needs of the community, the extension specialist, who is preeminently responsible for subject matter, should be confined as much as possible within this limitation, and that his time be so safeguarded against work in general methods that he may function efficiently in subject matter. Unless this is done, there is a danger that he will simply supplement the county agent, assisting him in his general methods and responsibilities. In such a case, the specialist's contact with the sources of information must suffer.

It is very desirable at this time to dwell upon those methods which have to do with particular subject matter. For example: A preliminary organization of areas for tuberculosis eradication requires a certain method of organization, in which not only the educational function of the extension specialist is concerned, but also relationships with veterinarians, livestock sanitary commissioners, etc. The successful accomplishment of a project of this kind depends upon harmonious cooperation among professional, regulatory, and educational agencies. Certain professional ethics are involved to such an extent that it is usually advisable, in undertaking this project for the first time in a county, to require the extension specialist to assume complete charge, not alone of the subject-matter teachings, but of methods as well. The specialist here may serve to demonstrate to the county agent the most efficient method, but his work in this line ceases after first or second township project has been completed.

We have discussed here the relationship of the county agent and the specialist to general and special methods of procedure. Under present conditions, in subject-matter teaching, the people in each community may be classed in three main groups on the basis of educational status:

- (1) Those who, because their interest has only recently been aroused, are in the elementary stages.
- (2) Those farmers who have engaged in special types of farming until they have become proficient in both theory and practice, and who may have had the advantage of a special course of training in their subject matter and are known as local leaders.
- (3) Those who are trained specialists and serve the community professionally in a commercial way, as veterinarians, etc.

Since it is well within the field of the county agent to give instruction in such subject matter as he is qualified to handle, it would seem practical that he teach elementary classes, and that the duty of the specialist in this connection be merely to keep the county agent well enough informed in subject matter to do this efficiently, thus protecting the specialist so that he may devote more of his time to the second group who require advanced instruction and may serve as instructors of elementary classes. With respect to the third group, there is a distinct field of service for the extension specialist. These professional agencies are many times a very important part of a community project. It is within the field of the



specialist to keep them in touch with the latest information of value to them. This may be illustrated by the following incident: Shortly after the development of the double method of vaccination for the prevention of blackleg in cattle, a farmer who was losing heavily from this disease called in a local veterinarian. The latter, not familiar with the latest methods in this connection, was unable to prevent a continuation of the loss of cattle. The county agent was then called. He recommended the use of the double treatment. This was given and at once the loss was checked. The result was that the entire community insisted that the county agent vaccinate cattle in all cases where blackleg appeared. This started a conflict that threatened to drive from the community the veterinarian, who really is a necessary agency. This matter would better have been handled by means of an extension veterinarian, who would have kept the veterinarian referred to fully informed regarding the latest developments in his profession, thus enabling him to render service equal to that of any other agency.

In this connection, it might be well to bear in mind that the extension agencies should grade their educational activities according to the technical information of those whom they seek to teach. It is within the practical field for the extension veterinarian to demonstrate the vaccination of cattle for blackleg, because the method has become so simplified that any layman can perform the operation. However, the prevention of hog cholera by vaccination is somewhat less simple, especially when both serum and virus are used, and this service usually can be best performed by the professional veterinarian. Consequently, it is not always safe or desirable to encourage the use of this method by the untrained farmer.

If the subject-matter specialist is to function as such, it is imperative that a relationship be established between him and the county agent which will relieve the specialist from responsibility for general method and elementary instruction and permit him to acquire from his subject-matter department its latest results in his specialty, these to be taught by him to county agents and local leaders. Furthermore, it is necessary that he be responsible for only such methods of procedure as are peculiar to his project. Unless these principles are observed rigidly, his efforts will be rendered ineffectual by his acting as a general supplement to the county agricultural agent. That both resident and extension workers are alive to this possibility is indicated by the fact that there is much discussion regarding the methods whereby the extension specialist can be more closely associated with the resident department.

#### HOW CAN THE SPECIALIST KEEP UP ON SUBJECT MATTER?

Having discussed the field relationship of the extension specialist, it is desirable to turn to his subject-matter contacts. There is some discussion of methods of administration whereby the specialist may be more closely associated with the subject-matter department.

The comparative value of these methods will not be discussed here except to say that from the information I am able to gather, those working under the various systems are usually quite well satisfied, since, after all, successful cooperation is mostly a matter of personnel.

Regardless of any system of administrations, the more fundamental consideration is the relationship to the educational program which includes subject matter and methods. One is distinctly the object of the resident department; the other of extension, and the best progress can only be made by a harmonious relationship between the two.

Since the specialist is the chief factor in extension responsible for subject matter, it is important for him to maintain a proper relationship to both agencies. In one extreme he may devote himself more completely to his subject matter at a sacrifice of his methods of teaching, in the other, he may depend mostly upon methods and neglect his subject matter. Either extreme is detrimental to the best results.

#### SUGGESTIONS FOR CLOSER RELATIONSHIP OF SPECIALIST TO RESIDENT DEPARTMENT

Various methods are suggested for bringing about closer relationship:

- (1) A definite assignment of specialists to headquarters, for the purpose of keeping in touch with subject-matter development;
- (2) publication of a newsletter;
- (3) tours of resident departments by extension workers;
- (4) exchange of progress reports;
- (5) encouraging advanced study.

Regardless of the type of administration or method of developing contact, it seems to me essential that this matter be considered not so much from the standpoint of an administrative relationship as the development of a method of procedure which will utilize all available support to the educational program as a whole, and that a plan be outlined defining the responsibilities of all agencies concerned—the resident department, the specialist, and the county agent. Most of the detraction of the extension worker is due to field demand, and the first objective of such a method is to define the field of all agencies, especially that of the county agent and specialist, so the latter may be limited, as far as possible, to that which contributes particularly to his specialty. Prerequisite to such a method of procedure is the provision for a definite amount of time to be devoted to the study of subject matter and to incidental calls.

It has been my observation that the time devoted to subject-matter study under this system has not been wholly taken advantage of by the specialist for two reasons: (1) His time is infringed upon by extension activities, incidental field work, and office work pertaining to the field; (2) he is not definitely associated with an investigational program.

The assignment of a specialist to a definite program of investigation is justifiable, if it contributes to his subject-matter information. To do this, it must be related to his specialty, and be general enough to be practically applicable to his extension responsibilities. It may be a line of investigational work, based on practical field observations. For instance, for a number of years our institution has conducted, in cooperation with farmers, as a part of experiment station work, certain investigations whereby experimental data are verified by practical farm trials under varying conditions throughout the State. Those who have been responsible for this line of work, since the force has been relatively limited, have not been confined to highly specialized subjects, but have covered, say, the entire field of agronomy. As a result, they have become extremely valuable as extension workers. From this observation, I believe that a definite assignment of some responsibility to extension specialists would be very

effective in maintaining their subject-matter knowledge. This gives joint responsibility in subject matter, regardless of the administrative organization and fosters an exchange of ideas.

Incidental calls, consisting of fair judging, institutes, as well as emergency calls, are important, but are usually preceded by little local preparation, and should be minimized as much as possible.

#### THE SPECIALIST'S METHOD OF PROCEDURE

The method of procedure covering the specific project should be (1) drawn by a joint conference of subject-matter workers, specialists and county agents, who have had field experience and know local conditions. It should also stipulate the responsibilities of the county agent for general methods of procedure and elementary subject-matter instruction. It should state definitely the service to be performed by the extension specialist. Should provide such systematic follow-up work as will accomplish permanent results. (2) It should be a part of the State program of educational development. (3) It should be a program of attainment for the area to which it is applied.

#### METHOD OF PROCEDURE A PART OF THE STATE PROGRAM

Resident departments are chiefly responsible for determining the educational program of the State. It is the business of the extension service to harmonize that program with local practice. The extension specialist is the joint representative of both agencies, responsible directly to the resident department for subject matter and to the extension division for methods. As such, he should be in charge of a project which will enable the resident department effectively to direct an educational program and the extension service to accomplish it.

The fields of the extension specialist and the county agent are interdependent, but should not be overlapping. However, a complete differentiation of their work is practically impossible. It is apparent that the extension specialist can reach so few of the total population in his territory that it is questionable if his existence can be justified on that basis, but if he is a teacher and trainer of groups of leaders and they the teachers of individuals, his work is justifiable. He must demonstrate a program that will create a state-wide influence, and organize his work and enthuse others with its importance to the extent that it will be carried on, not under his personal supervision, but under that of the leaders he has trained.

#### THE FUNCTION OF RESEARCH DEPARTMENTS IN DETERMINING EXTENSION PROGRAMS

BY G. I. CHRISTIE

Successful agricultural extension workers must plan and follow a definite program. The practice of giving miscellaneous lectures on calls from various sections of the county or State and holding demonstrations without reference to any system or plans for regular follow-up work is being rapidly abandoned. Agricultural extension workers realize that their time and energy must be conserved and utilized in an organized way

on definite problems if the people are to receive the best help and if worth-while results are to be secured.

To outline the extension program for a State, a county, or a community, is an important and difficult task. It is necessary to know the problems. It is necessary to have the active cooperation and approval of the people of the territory in which the work is to be conducted. It is necessary to have all the available information on the problems to be attacked. It is necessary to have sufficient information to secure the success of the project undertaken. It is necessary to have the advice and assistance of experiment station workers.

The improvement of the potato crop in a State, district, or county, may be taken as an example. In outlining an extension program on this subject many factors must receive consideration.

- (1) Can potatoes be grown successfully?
- (2) Do the farmers wish to grow potatoes?
- (3) What variety of potatoes shall be grown?
- (4) What is the best source of seed?
- (5) On which soils shall potatoes be grown?
- (6) What fertilizers give best results?
- (7) Methods for control of insects.
- (8) Methods for control of potato diseases.
- (9) Methods of cultivation.
- (10) Methods of harvesting.
- (11) Methods of storage.
- (12) Markets and marketing.

The extension worker should not attempt to determine these points without assistance. The experiment station is directly interested in this potato work and the teachings of the extension specialist. In some instances definite information will not be available on all phases of the subject. New problems on fertilization, insect control, potato diseases, and other important points have not all been solved. New questions will arise as the demonstration work progresses. Shall the extension specialist undertake to conduct experiments and tests and attempt to settle these questions or shall the research worker of the experiment station determine the points in question and outline and conduct the necessary investigational work?

Agricultural extension work, as stated in the Smith-Lever Act, consists of teaching and giving practical demonstrations in agriculture and home economics. The work is strictly educational. The instruction should consist of giving information on the known truths of agriculture and home economics.

Many demonstrations conducted by extension workers have been largely of an experimental nature. They have been conducted to secure information and determine the right and wrong practice rather than to demonstrate facts already known and proven by experiments and tests. It is this work which leads extension workers into the danger zone and raises the question of the field of extension and the experiment station. Such work has caused confusion, dissatisfaction, and loss. It is also true that extension work has gone forward in a slow way for the reason that much time of the workers has been consumed in conducting experiments and tests rather than demonstrations.

The fields of work for the experiment station investigator and the extension worker are distinct. The investigator should confine himself to experimental work in the laboratory and in the field. The extension worker is supposed to take the results of the experimental work and the practices of the farm and home, give these to the people and secure their application. In practice, however, it is found that experimental work on many problems in most of the States has not gone far enough to give the extension worker the needed information. It is necessary, therefore, to limit the instruction on many subjects and refrain from conducting demonstrations or doing as many workers are now doing, take up work which will not aid the people in solving their problems.

Agricultural colleges are interested in giving the people on the farms and in the homes, every possible help. They should be interested in aiding the extension workers in carrying out the instruction and the demonstrations to a successful conclusion. It is in such work and for this reason, that there must be close cooperation between the experiment station and the extension department. It is almost necessary that the investigator of the experiment station have a part in the larger number of the important extension projects. Extension workers should not be required to assume the responsibility of experiments and tests. The experiment station should be responsible for this part of the work even though the extension workers give assistance in conducting them. With the assistance and guidance of the experiment station, the extension worker can render a large and valuable service and give to the people most helpful assistance.

Extension workers should not be criticised too severely for the plan they have followed. There has been a big demand for assistance. The extension worker has been expected to give direct and valuable aid and in an attempt to make good he has gone forward—though many times in the dark, with the task assigned him. In many cases the experiment station can be blamed for the situation in which the college workers find themselves, with reference to extension projects which have been undertaken and which have failed. Many experiments conducted by the experiment station have given valuable truths but have not been carried to a practical conclusion. The results of these experiments have been published in bulletins and magazine stories and then the workers have taken up other projects. When extension workers undertake to demonstrate these truths developed by the investigator, they find many troubles in making a practical application. It is necessary to make many modifications and many times a complete change in the recommendations. A large amount of time of the extension workers is used in conducting tests and doing the work that belongs to the experiment station.

Some States follow the practice of employing extension specialists who operate on an independent basis and have no relation to the experiment station. This worker is engaged because of his knowledge of the subject and he is authorized to carry on his work independently of the station workers. This practice is not to be recommended. It is absolutely necessary that the agricultural college have one policy and one source of information on all teaching for the extension service. If the extension workers are permitted to extend one line of information and the experiment station send out another, farmers soon learn that the "doctors" at the college disagree. This immediately brings out a division in the field,

destroys confidence in the work and does great injury to the agricultural college. The confidence of the farmer in the teachings of the agricultural college, must be carefully guarded and maintained. The troubles which results from varied teachings and a lack of harmonious teachings, fall upon the agricultural college of the State—not alone upon the extension service, the experiment station or the United States Department of Agriculture. The institutions which are supposed to guide the development of agriculture of the State are bound to take the full responsibility.

The question of administrative organization of extension and station work has received some consideration. Some institutions have one director in charge of both lines, while other institutions have a separate director of extension and director of experimental work. A study of this situation shows that the question is not so much one of organization as it is one of personnel. The persons in charge of extension and investigational work must actively cooperate in developing the big program of agriculture. The teaching, investigation, and instructional work of any one subject is not necessarily coordinated through the extension director or the station director. The coordination of this work should take place in the subject-matter departments. The head of the subject-matter department should be called upon to assume some responsibility for the work of the extension men and he should see that their teachings and demonstrations are backed up in a strong way by the experiment station. In actual practice the extension worker can be of as great help to the investigator as the investigator is to the extension worker. The extension program will be strengthened when it has the full support and active cooperation of the research departments.

A great many excellent workers are found in the departments of agricultural extension. They are strong men and women, with good training. They have a knowledge of fundamental scientific work and are real students in their work with the farmers and the home-makers. They see the things that are happening and get ideas at first hand with reference to production, marketing, and other problems. The men and women who have this contact with the people are bound to become a recognized force. They should and do gain the respect and confidence of the people with whom they work and these people look to them for help and guidance. Every agricultural college man should rejoice in the fact that there are such men and women in his institution.

However, there is no reason for believing that the extension man or woman is more influential or knows more than the man or woman who works in the laboratory. Because a man can not appear before a body of people, make a good contact and inspire a big crowd is no reason that he should be put in the background or his work discounted. The experiment station worker can not afford to assume second place. The director should not permit it. The research men and women must have a prominent place in the extension program. Station directors will have to consider the advancement of their workers. If the research men and women are to keep abreast of the times they must play an active part.

This is a time when we need results from the experiment station. Some people have mentioned the vast fund of information now in storage—enough for fifty years or more. We are so far past that fund of information that we do not recognize much of it. The facts given with reference

to soils are far different from those of fifteen years ago. New problems and conditions demand a large amount of new investigational work. The States must get behind these programs and keep their departments thoroughly up-to-date.

Agricultural experiment stations are in great need of funds. The work is seriously handicapped because of lack of workers and equipment. If the experiment stations are to meet the increasing demands of extension work the investigational forces must be increased. This is a problem of both the station and extension departments. The extension workers are directly dependent upon the experiment station work. They are seeking answers to many questions and problems presented by the people in the State. The extension worker can not conduct these investigations himself. He has neither time nor equipment. It is not his field of work. The experiment station must assume responsibility and give assistance.

One of the best things extension workers can do is to join hands with the experiment station workers and lend them every support. They should emphasize the work of the research departments of the institution, and the United States Department of Agriculture. It means much to have extension teachings backed by results of careful worth-while investigations. The greatest agricultural fort is a strong active experiment station. Extension work carried on independently of the experiment station will not go far nor mean much. But extension work that is guided by the facts derived from research will build a strong and permanent agriculture.

Adjourned.

## SECTION OF ENGINEERING

TUESDAY MORNING, NOVEMBER 21, 1922

The meeting was called to order by the chairman, R. L. Sackett, Dean School of Engineering, Pennsylvania State College, who presented the following paper:

## THE COST OF TECHNICAL EDUCATION

BY R. L. SACKETT

This subject was chosen because it had not been discussed before this body and because it is our duty to consider and practice economy, so far as it is compatible with high standards of instruction and with the selection of instructors of high ideals and proper attainments.

Many of the problems mentioned refer to the whole institution rather than to the technical divisions only. They are, therefore, questions of general policy and it must be understood in advance that there is no desire to embarrass our executives, but only to discuss various phases of the subject in a sympathetic, unimpassioned, business-like manner. It should be clear to our constituency that we are not afraid to discuss economy, when so much of the world is compelled to practice it so rigidly. It is generally recognized that the land-grant colleges have been so restricted in income that economy is habitual. No class of public institutions can show as much material and spiritual value for each dollar expended as can the land-grant colleges.

Members of the faculties have been seriously embarrassed by the increased cost of rent, food, and clothing, far out of proportion to the increases in salary received. No one who knows the facts can do other than approve the wage increases which have been made, and further increases are necessary before the cost of their education, the expense of maintaining their social position, the rights of their families, and the value of their technical skill have been reasonably recognized.

Consider the skill of a plasterer, receiving fifteen dollars a day, the cost of learning his trade, his seasonal employment, the demands of church, society, and his union. The average instructor does not receive comparable pay. The same is true of other trades where the pay of the teacher does not compare favorably.

We talk glibly of the intangible values which accrue to the teacher, especially the college professor. He has his summer for travel, for which he pays. He has a good library, which is an added expense. He belongs to technical societies, and pays his dues. He has delightful associations with other teachers and with students. The average teacher appraises these factors in his life very highly. They would not be valued if he were not devoted to teaching. In fact his devotion, like that of the minister, has been capitalized and the very reasons which render his service the more valuable have been used as arguments for a smaller compensation. The teacher deals with men, philosophy, life, rather than with materials. It is a rule that the more delicate and difficult the material with which the artisan or artist works, the more the talent required, and the better the pay received. However, the truth does not always follow reason. The return



is very largely proportional to the dividends produced and they, in turn, depend on material production. The latter depends on our industrial leaders, and they have been developed on the job to such a large extent in the past, that technical education still stands on the same level as academic education, which prepares men for life but not for the production of wealth. Until education has made a deeper impress on the character of industry than it has yet made, the financial returns from industry will be greater than from teaching. Until the essential weakness of our present industrial system is understood and the human element is duly emphasized as the all-powerful one, the crucial element in the establishment of a permanent foundation for peaceful and efficient production, we shall have the present unstable and uneconomic conditions to face.

There is another reason why we have not been concerned with the cost of technical education. We have pet phrases which sound well and help to bolster a weak argument. "You get what you pay for" is one. It is often true and often untrue. We know that quality and price ought to go together, and yet during recent years, price has changed without a change in quality, in many instances.

We desire to improve the quality of our technical instruction, therefore, an increase in cost seems logical. A reduction in cost implies to some minds a reduction in quality. Let us understand that no step which will impair quality is to be considered, and that a constant improvement in quality is to be striven for.

#### THE QUESTION

The question then is: In the cost of technical instruction are there factors which are not justifiable or which can be reduced without impairing quality and which have not been as fully controlled as they should be?

The cost of an education may be divided into two parts: First, the cost to the student or parent, and second, the cost to the taxpayer, who is neither student nor parent.

The cost to the student or parent consists of rent, board, social activities, clothing, clubs, books, tuition, and fees. The tuition fee at land-grant institutions is generally so low as to be a small factor in the total cost to the parent and there is little chance of its being less. It would seem the part of wisdom not to increase the tuition for fear of losing more than is gained.

There has been and still is a tendency to emphasize the aristocracy of learning, as if membership were reserved and should be reserved for the elect—a self-perpetuating oligarchy where those who have entrée select their successors. A tuition fee of \$200 to \$500 a year is justified by some on the ground that only those who can afford it should have that kind of education. It is fortunate that we have a variety of educational institutions in this country, so that those who desire may find a college suited to their means, democratic in spirit, with substantial ideals and a concern for the moral and religious life of its students.

Fees covering laboratory materials, breakage, library, health, and similar services are considerable for some courses but would probably not amount to 10 percent of the total annual cost in any case.

Books constitute a variable item, on the average not large, but there are teachers in nearly every institution who are guilty of requiring or requesting students to purchase more books than are really useful. This is a factor that the institution can control, but often does not.

At the other end of the list are room rent and board, which are very largely determined by the conditions surrounding the institution, the demand and the supply. In most college communities rentals are higher for corresponding service than in other communities because renting in a college town is a major enterprise and in other towns it is incidental or a minor means of supporting the tenant or owner. The student is also inexperienced in dealing with owners and is, therefore, at a disadvantage. Board is of a better quality but often less expensive than in an industrial city. These two factors constitute at least fifty percent of the necessary cost of college life, and the institution, as a rule, has or exerts no control over them. It can control the cost and quality of board by operating a "commons" or dining hall with a well balanced menu at a low price. An extensive dormitory system would likewise control the cost of housing, but no American institution has given the same weight to this factor that English universities give. They make much more of the institutional and social welfare of the student, especially the graduate student, than we do.

In such American colleges as have dormitories the cost is probably not less than but equals or exceeds the cost of living outside. There are dormitories of considerable architectural elegance in the United States, and if the student pays interest on the invested capital the cost must naturally be high. But is this a proper cost to put on all students independent of their means? Should students be required to bear an overhead on the cost of elaborate dormitories if they live in them, or suffer a mild form of ostracism if they do not? It is not in keeping with democratic ideas to have different prices for different grades of elegance in dormitories on the campus. The best solution would seem to be for the land-grant institutions to have dormitories of such architectural quality as they can afford or provide for all that desire them and at a cost so low that it will not prevent a worthy, energetic, thrifty student from attending college.

The State pays neither taxes nor interest on its investment in buildings. It can heat and light buildings more cheaply than can the individual owners of houses and apartments. It can then control sanitation, lighting, heat, and other service and do so at a lower cost than any other agency. The recent influx of students to land-grant colleges has tended to raise rents. The only way to control the cost of housing is for the institution to have dormitories in sufficient number and of such character that they will invite a good class of students and at the same time be both desirable and economical. Furthermore, the present forms of hazing and fagging are rendered more difficult or more controllable where some of the freshmen live on the campus.

The several items above mentioned seem to warrant giving more attention to housing than this subject has received.

## FIVE-YEAR AND SIX-YEAR CURRICULA

Five and six-year courses are being discussed and the offering of additional options and the increased length of time devoted to preparation also tends to increase the cost, both to parents and to the institution. It would seem the part of wisdom to consider possible economies, such as operating the college plant for twelve months in the fiscal year. This involves many difficult problems, as any change from an old order to a new always does. Probably the four-quarter plan would be an incident to continuous operation; the three-semester plan is also feasible. Plant maintenance, depreciation, repairs, and insurance are reduced in cost per student per semester or term. Interest and taxes are not considered as we are discussing State institutions.

Since we have been considering an expense usually borne by the taxpayer, let us consider another item falling on him. Specialization adds to the cost of instruction and places a burden on the taxpayer, or on the income whatever its source, which needs consideration. The industries have warned us that extreme specialization is unnecessary and that they want the graduate whom they employ to be thoroughly drilled in the fundamentals of science and of engineering. They also claim that he is weak in these major factors.

No doubt a certain degree of specialization is desired and desirable. Abandoning it and substituting more reading, writing, and arithmetic would not make all graduates both appreciative of and efficient in these subjects. The old order of education did not make them perfect nor will any new order overcome all the defects of inheritance, early environment, inexperience and immaturity from which students suffer more or less. However, it seems safe to say that each institution will decide this question for itself and that too much standardization is undesirable. At the same time it is uneconomical to carry on highly specialized courses in each institution in every technical specialty. It is a seductive temptation to which most institutions have yielded more or less. The pressing poverty of land-grant institutions and their consequent inability to meet all the numerous and rapidly increasing demands made on them for specialization may have been a benediction in disguise. It seems wise and economical to recognize that in some lines a few strong specialties will serve many States. A strong group pride might lead to greater unity in presenting to the country and in supporting much needed legislation. At present each institution is striving to cover, as nearly as possible, the whole field of technical knowledge and enters into competition where it might be good policy as well as economy to cooperate.

## GRADUATE STUDY

Graduate study is being emphasized more than heretofore in land-grant colleges and it is appropriate that it should be. Here, too, it is desirable that artificial barriers should not be erected which might prevent the able student of modest means from pursuing graduate work.

There is a certain glitter about graduate study which is very attractive, but all is not gold that glitters. Not all graduate work is of a character which warrants the time and effort of the student and faculty. Some of

it is of an artificial character, lacking in permanent value, stilted, and not constructive of sound ideas concerning life.

A reduction in cost is possible if institutions will specialize in their graduate work so that those who desire one line may go here and those who desire another line of study may go elsewhere. There is not the same demand for graduate study as for undergraduate, and economy would be effected if institutions selected those branches for graduate study which they are especially fitted to conduct.

Clothing and clubs are not sources of general extravagance in technical institutions or items to which an institution need give attention so far as cost is concerned. It is possible that some members of faculties transgress by giving students an incorrect idea of clothes and the part they play. Clothes do not make the man, but they may misrepresent him, and misrepresentation ought to be a college misdemeanor.

#### SOCIAL ACTIVITIES

The only remaining item of undergraduate cost is that of social activities. This detail has increased in many institutions to the point where it draws a social line between those who can afford to keep pace and those who can not or ought not. No doubt many administrators will say that personal expenses are outside the province of an executive. The latter has enough troubles without meddling in affairs of a private character which family and son can regulate. Or it is argued that the student should have liberty to do the wrong thing, since he will soon be "on his own" and must then decide for himself. Perhaps no answer can meet all the objections offered, but parents blame the institution for the extravagances of their sons and daughters. It seems reasonable to expect such institutions at least to announce their position on such questions as social extravagance, even if they do not attempt to enforce their opinions. The fact is that some colleges either sympathize with the "aristocracy of learning" or lack the moral courage necessary to define their opposition to extravagance, or the tact required to maintain a rational position on questions which arouse opposition. Conditions have been allowed to grow until they have become undesirable. To oppose them is more difficult than to have regulated them during the period when social affairs were rising to undue prominence. However, a tendency or a condition exists and the Federal act on which the land-grant colleges are founded specifies that liberal and practical education is to be provided for the industrial classes. Being Federal and State institutions, these colleges and universities owe a somewhat more definite loyalty to American ideals of citizenship than falls on privately endowed institutions. All are loyal to the general principles of democracy, but on Federal-State institutions a more positive duty rests in teaching and exemplifying thrift, frugality, economic soundness, social equality, and the homely virtues of natural, national life. How can we expect our educational institutions to preach successfully the virtues which they do not practice? Recent years have shown that high wages do not bring industrial peace and progress, that extravagance is easily acquired by a considerable fraction of our population, that thrift is after all a matter of education of appetites and of restraint of desires. The writer knows that colleges can not change human weakness in a generation, but he argues that it

should and can exert a rational influence on those who go to college and which will give students a better sense of relative values and a sounder philosophy of life.

We have just said that a different responsibility rests on the land-grant colleges from that which falls on privately endowed institutions. The latter were founded on the idea that they should offer opportunity to acquire learning but should not assume responsibility for the physical or moral welfare of their students. They have changed, and all institutions feel a greater responsibility for the physical and to some extent for the moral welfare of the students. But a peculiar obligation rests on the shoulders of State institutions to uphold our national ideals, to teach the duties of citizenship, the fundamental principle of sound industry, of happy human relations, of political righteousness. And the land-grant colleges have a special and peculiar opportunity to serve the industrial classes, the great middle class of American life, by opposing the irrational and destructive isms which are being circulated so generally, and by presenting a saner and more human philosophy which may in time influence our professional, technical and industrial life and become a potent factor in directing our material and spiritual progress.

#### DISCUSSION OF DEAN SACKETT'S PAPER

J. W. VOTEY, Dean College of Engineering, University of Vermont. The subject of Dean Sackett's paper is of extreme interest to all of us who are engaged in this work of technical education. It is also a matter of vital importance to the student or his parents who have to pay the cost of such an education.

The colleges are confronted with a constant increase in the cost of their their operation, while on the other hand, each year sees many worthy young men unable from lack of funds to realize their ambition to secure a higher education.

It is generally understood to be the special mission of each land-grant college to furnish the young men of the State the advantages of an education along agricultural or mechanical lines at the lowest possible cost. And this cost should be within the reach of every young man desirous of a technical education and who is fitted to profit by it.

In discussing this matter we can consider the cost from two points of view, first, the cost to the student and, second, the cost to the college. The first of these points is, of course, dependent on the second.

The student's expense account for the college year may be divided into the following headings: First, tuition, and other college charges; second, board; third, room rent; fourth, books, instruments, and supplies; fifth, clothes, travel, and miscellaneous expenses. The first item, the college charge, is usually the largest single item in the student's budget, and over this he has no control. Unless aid is furnished he must pay whatever the college sees fit to charge and any reduction in the cost of his education in this respect must be initiated by the college.

Board is a variable item and the student has more or less option in his boarding arrangements and the price he must pay. The college can assist the student in this matter, either by operating its own boarding house at cost price or by arranging in some indirect manner so that the price of

board in the vicinity of the college is not placed beyond a reasonable rate. Every college has probably had an unfortunate experience in trying to furnish economical board to its students. Of all human beings the college student is the hardest to satisfy in this respect. The general introduction of the cafeteria plan has in a great measure been helpful in supplying board at a reasonable rate and in a manner satisfactory to the student. In connection with this matter of furnishing cheap board to students I wish to call attention to one point which I think is of importance. Where students herd together in what are properly called feeding places, competing with each other to see who can consume the maximum amount of food in the minimum amount of time, there is lacking the cultivation of some of the social graces which are commonly considered a necessary part of a gentleman's equipment. I would personally prefer to have a student pay a little more for his meals and board where table manners are in evidence and ennobling conversation at least possible.

The college may be able to assist the student in keeping down the expense of room rent if it can establish a proper dormitory system. This is especially true if only the cost of operation and up-keep are charged as room rent. There is, however, the possibility of having so elaborate a system of dormitories as to make the room charges unnecessarily high. If rooms in private houses are available this generally adjusts itself.

The expense of books and instruments for technical students is a considerable item for the entire four years. The college can help a student here by furnishing both books and instruments at actual cost. It should be noted, however, that in computing the cost of textbooks there must be considered the loss that usually goes with this item in the matter of new editions and change of authors. The individual professors can assist the college in keeping down this expense by better cooperation in the matter of changing textbooks and in accurately estimating the number of books needed for current use.

When we come to the items of clothes, travel, and miscellaneous expenses we reach that part of the student's budget that is in a large measure beyond college influence or control. This is a matter that depends upon the personal habits of the students. It is the difference in student's habits that makes the wide range between the minimum and the maximum in the cost of the college education. The miscellaneous item may be the largest factor of the student's budget. The colleges may be able in some cases to exert an indirect influence to see that there is not established in the college circles false ideas of college life and social standards which may increase some of these personal expenses. Included in this miscellaneous item there is also the matter of society, club, or fraternity expenses, class activities, social functions both within and without the college, amusements and the various ways in which the enterprising college student finds he can expend his surplus funds. Class rivalry and fraternity rivalry are often responsible for piling up the expense of social functions held by these organizations. Some influence should be brought to bear to prevent the poor student from being obliged to pay for elaborate class publications he can not afford, for functions he can not attend, or privileges he can not enjoy. The proper solution in such cases is to do away with the unnecessary expenses and let all share alike. In the democracy of the land-grant college the poor boy should not be labeled.

Turning now to the cost of the education to the college we find that the largest items in the budget are usually in this order: Salaries, maintenance, and administration. In considering what possible chance the college has to cut this expense account down we find that in the first and largest item, that of salaries, there is no opportunity for a reduction. It is universally agreed, both within and without college circles, that college instructors are the poorest paid of any group of professional men unless it is ministers. Although there has been some improvement in recent years, in the majority of institutions the salaries are still on a scale far below that justified by local living conditions. We must expect to see this item of the budget increase in the future rather than diminish. We should, however, in the interest of economy see that adequate service is rendered for the salary by each member of the staff whatever his position.

The college has its largest opportunity for cutting expenses and exercising economy in the maintenance account, if under this heading is included the up-keep of its buildings and mechanical plant, the operation of the latter, and the purchase of all supplies used by the institution. A well operated purchasing department may greatly reduce the cost of supplies. In the design, construction, maintenance, and operation of the buildings and mechanical plant there are many possible economies. These are largely engineering problems and should be handled by engineers, but it may not be desirable to depend upon the teaching staff for this work. The advice of the staff, however, may be of great value in this connection.

When we come to the cost of the administration we have a practical business problem which should be worked out under the methods that have been developed in modern business circles. Constant oversight is necessary to see that the organization is kept up to date in all of its details. The same economies that are practiced in private business where a profit is expected to be shown at the end of the year should prevail in the handling of the college funds. Some of the teaching staff and others who share in the expenditure of these funds do not always remember this.

There is one possible opportunity to reduce the cost of a college education which is not always given consideration. In every institution the cost of educating a young man is several times what the youth pays for his education. Every student who enters is an added financial burden. We can divide the men who apply for admission to college into three groups: First, those who are in every way properly qualified to pursue a college course with profit; second, those who have no mental capacity for doing college work; third, those whose habits and attitude toward college work prevent their successfully pursuing a college course. Men from these last two groups are likely to be found in all of the colleges. Why should the colleges lumber up the class rooms, needlessly take up the time of instructors, and waste college funds in the impossible attempt to educate these two groups of men? If each student adds to the college expense what possible excuse is there for increasing the student body with these men who are not of college caliber. If more attention were given to determining who can profit by a college education and less to the size of the student body the cost of the education might be reduced. The student turn-over, to use the industrial expression, is too great for efficient operation.

In considering how the college may increase its income or reduce its expenses there is one other factor which deserves careful consideration. We can divide the student body into two groups: Those who can well afford to pay all of their college expenses and those who can pay a portion only or none of such expense. In the earlier days of college education it was considered necessary to induce young men to take advantage of the course in higher education by offering such education free or at as low rate as possible. This inducement to the young men to pursue a college course is no longer necessary. Every young man today realizes the benefit to be derived from a college education. Under these circumstances, therefore, why should not a young man, who is financially able, be required to pay the cost of his education? In other words, why should not the college charges be placed at a figure that will cover the actual cost? Then let those students who can afford to, pay their bills. This plan, however, should not be carried out unless, at the same time, there is made suitable provision for the financial assistance of those students who can not afford to pay these charges. No bars should be placed in the way of the poor boy who is seeking a college education. Scholarships and loan funds should be provided to take care of all deserving cases. The word "deserving" is here used advisedly, as without careful supervision such financial assistance will be granted to those who do not need it or to certain groups of students who do not deserve it or should not have it. Abuse of this system of student aid is familiar to all. It should always be carefully supervised.

We can to some extent reduce the cost of a technical education if we avoid needless expenditures for unnecessary laboratory and shop equipment. Some over-enthusiastic instructors feel that they must have everything on the market, no matter whether needed or not. Every institution has in its shop and laboratory equipment more or less apparatus rarely or never used. Possibly it has some advertising value, but is it worth it?

Finally, let me say, that the cost of a technical education in the land-grant colleges should be kept at the lowest possible figures so that it may be within the reach of every deserving young man who aspires to it. To secure this end the most careful supervision should be given to the expenditure of all college funds by all connected with the institution. We should not attempt to educate young men who can not be educated nor give free education to young men who are able to pay for it.

E. A. HITCHCOCK, Dean College of Engineering, Ohio State University. Our chairman, Dean Sackett, does not know it, but I certainly am indebted to him for inviting me to discuss this subject of "The Cost of Technical Education." This is because in order to obtain some facts and figures I have been compelled to go over many financial reports of our university, covering the period from 1878 to the present time, and the information obtained has not only been interesting but will be valuable for future comparisons. In considering this question my thoughts have returned to our educational days when we were out after that which our boys are working for today.

I am quite sure that there is no one here who entertains for a moment a regret that he cast his lot in the field of engineering many years ago. It, however, was not a case of casting or selection, it was a case of recog-



nition of responsibility and facing it, although we did not at that time recognize it as such.

For many, just as it is today, it was a struggle of several years' duration, an endurance test, during which there was no turning back and during which there was no wavering in determination to see it through to the end, to complete the training prescribed for the particular field of engineering which we had entered.

In those early days there was much less conception of the meaning of engineering than at the present time. All we knew was that we possessed an inborn desire to build railroads, or to build locomotives, or to operate electric lines, etc., and the desire to do these particular things was very definitely fixed.

As to what this training process or rather engineering education was going to cost, that was of secondary consideration. The fact was that such an education was desired, and get it we would. It was in the blood, and there to stay. If the cost had been twice what it was, the numbers in training would have been diminished very little.

There was much of dogged determination, which through many years has not lessened one iota, judging by the marvelous accomplishments of our engineers as we see them today in the engineering world.

Judging by my observations during the past two years, I do not believe that the spirit of determination on the part of our engineering students is in any degree less than that of our day. They seem to have that same dogged determination, although not possessing the same degree of confidence as to their place in the educational processes. When students are so determined upon obtaining an education that they will do outside work nearly all night long, night after night, meeting their classes regularly day after day, we must admit that the question of cost does not, to any great extent, enter into the completion of their education. I do believe, however, that the student of today is, on the average, more particular as to the quality of his work and as to the manner in which it is presented to him. Some time ago a group of students entered a protest as to their lack of ability to get their mathematics. This condition was largely due to the excessively large size of the class, and although the students had no complaint to make as regards the grades they were getting in the subject—in fact these grades were above the average—they did feel that they were not getting the mathematics as they should get a subject which they knew to be the foundation of engineering.

In order to get at the actual cost to the university and to the student, and the increase or decrease in such costs, I have compiled the figures given in the following table for the years 1880-1890-1900-1921.

**TOTAL YEARLY EXPENDITURES WITH STUDENTS AND GRADUATES AND YEARLY COSTS TO STUDENTS AT OHIO STATE UNIVERSITY, 1880 TO 1921**

For year	Number of students	Number of graduates	Cost to university per year						Cost to student per year
			Total expenditures	For salaries only	Per salaries		Per graduate		
					Total	Total	Salaries		
1880	217	9	\$ 48,500	\$ 26,400	\$224	\$124	\$5,400	\$2,930	\$129 low 186 average
1890	471	30	90,580	51,000	192	108	3,020	1,700	124 low 244 average 359 high
1900	1,252	137	308,490	153,197	246	124	2,250	1,120	143 low 221 average 348 high
1910	3,275	370	922,000	429,880	281	130	2,490	1,160	250 low 400 average
1921	8,300	1,070	3,287,000	2,049,000	396	246	3,050	1,290	659 average

The above table is based upon the total university expenditures and also the amounts for salaries only. The last column gives the estimated cost to the student and is made up of all fees and costs of books, board, and room, with an item of general expense. In order to see how the estimated cost to the student checks with my experience between the years 1886 and 1890, I dug down to the bottom of an old trunk and found my account book for those years, which gave in detail all costs, both educational and personal. In order to make the costs comparable with those given for Ohio State University, it was necessary to allow for the difference in tuition. After making this allowance, I found that the actual cost per year was \$184 which, as you will observe by the figures given in the table, checks closely with the amounts given for the years of 1880 and 1890. It is to be noted, therefore, that the cost to the student in thirty years, has jumped from about \$185 per year to about \$660 per year.

In order to note the increase in cost to the university, if any, during the past twelve years in the strictly engineering departments, the departmental expenses were computed for the two periods of from 1910 to 1917, inclusive, and for 1921. The years intervening between these two periods are omitted due to the very abnormal conditions caused by the war. The total expense for the eight-year period was \$694,940 and for 1921 was \$175,420. There were 903 engineering graduates during the first period and 170 graduates in 1921. The cost per graduate were \$770 and \$1,030, an increase of 34 percent, due largely to a general salary increase which took place just after the war.

The above figures and also those given in the table do not indicate the true cost to the university applicable to engineering students. In order to determine as accurately as possible this true cost per graduate in engineering and also per student, I have taken figures for the year 1921. In computing the cost, interest and depreciation upon buildings and equipment have been considered and proportional costs to the departments of chemistry, physics, mathematics, and English have been determined, as

well as the proportional share of expense due to library, administrative offices, and service department. The quantities as determined are given in the table below:

**COST OF ENGINEERING EDUCATION FOR THE YEAR 1921, AT OHIO STATE UNIVERSITY**

Cost of engineering buildings.....	\$479,153
Cost of engineering equipment.....	319,943
Interest at 6 percent on buildings and equipment .....	\$ 47,940
Depreciation on buildings at 1.2 percent .....	5,750
Depreciation on equipment at .5 percent .....	1,495
Proportionate charge of library service, executive office, heating and lighting service .....	89,000
Engineering college administration .....	7,920
Engineering college, departmental expense .....	175,420
Proportionate charge for chemistry, physics, mathematics, and English .....	68,000
Total yearly cost .....	\$395,525
Number of engineering graduates .....	170
Number of engineering students .....	1,423
Cost per graduate .....	\$2,320
Cost per student .....	\$ 277

The total cost computed, divided by the number of engineering graduates, gives a cost to the university per graduate of \$2,320 and a cost per student of \$277.

Now what is the actual total cost to the student, taking into consideration what must be spent by that student or his parents directly chargeable to his education and also what the student could have earned provided he entered employment rather than seeking an education? This total cost for a four year period I have estimated to be \$4,550. Of this amount \$1,900 is what the boy should have saved during four years of labor at \$100 per month.

It is, therefore, to be noted that the true cost of educating this student is a case of where he really provides \$2 and the university provides \$1. The student says, "I want this engineering education and in order to obtain it, I am willing to furnish two dollars for every dollar the State is willing to invest in me." The State, of course, is doing more than providing this particular student with his education, it is also educating to some degree many others who do not graduate. There is no question as to the value of such an investment by the State. Educated engineers, with hardly an exception, are making good in all parts of the country and their value to the community can not be estimated.

It is seen from the first table that the salary cost to the university per graduate has not increased materially during the past twenty years. This, I believe, has been largely due to the increase in our load factor. Twenty years ago our classes were probably half the size that they are at the present time and the proportionate increase in students has been very much in excess of the proportionate increase in instructing force. Where the increase in students has been 100 percent, the increase in instruction may have been only 25 or 50 percent.

Our figures show the great increase in cost has been to the student and I do not see how that cost can be reduced to any great extent. Dormitories have been mentioned as one possible factor in reducing costs. Dormitories might be used at some institutions, but in our case their erection would be very improbable. This improbability is proven, not only by the

crowded conditions of our many classrooms, but by the almost impossibility at times of obtaining sufficient classrooms. At one time last year in our college it was necessary to divide a very large section in mathematics. This section came at 10 o'clock. An additional instructor was obtained but nowhere on our campus with its forty or more buildings could be found a vacant room at that hour. When such conditions prevail, it will be a long time before the university authorities are in a position to erect dormitories rather than buildings for classroom purposes.

As I see it, there is really one way we can reduce the cost of education to the student and that is relatively, by making more nearly a 100 percent delivery, giving to them through proper instruction more nearly that which they should obtain and for which they are spending their time and money. I do feel and have felt for a long time that in many of our courses there is a great deal of "wattless" material—in other words, froth or "watered educational stock." There is too much student entertainment. If we will give to our students more nearly solid matter and also that which they must have in order to meet the demands which will be made upon them in the future, we are really reducing the cost of their education. I am afraid that there are many of us whose visions extend very little beyond the boundaries of the campus. We do not get outside of the educational atmosphere and do not realize what will be expected of the engineer in the near future.

There was recently held at our university a Management Congress and many facts were presented which made us realize more than ever before our responsibility and that we were not keeping abreast of the times in our educational field. It looks as if we really have been "asleep at the switch."

What some feel will be expected of the engineer in the future is set forth in an editorial by Mr. Crane in the November, 1922, number of *Current Opinion*, which I now wish to read to you.

"The engineer. What the world needs is engineering. What has impeded the progress of the world has been its theorists, metaphysicians, philosophers, theologians and other speculators and hair splitters.

An engineer is a man who takes force and finds out how to work it that he may do some good to the race. This is much more to the point than speculating where the force came from, what is its nature and where it is going to.

We need the engineer in politics. The socialist and every other kind of an ist are merely dealing in riddles. An engineer deals with facts. Instead of constructing some fine spun theory about government, he would take people as they are and the laws of nature and of business economics as they are and try to work out something from them that would do good to humanity.

We need the engineer in religion. Religion deals with moral force. It is vastly more important to set this moral force to work, to learn its laws and to operate it for the communal good than it is to find out where it came from.

We need the engineer in the schoolroom. Instead of puzzling with theories of education, we should take the child as he is and try to make something out of him.

We need the engineer in the business world. Whenever a man begins to talk about capitalism or labor you may know he is up in the clouds. Really there is no such thing as capitalism nor as labor. These are artificial abstractions—mere counters to argue with. The real things are human work and human welfare. Work is the energy of living people and capital is the stored energy from dead people.

And there is but one problem and that is how to manage these two forces of energy in a way to produce the most human welfare.

Some day we are going to kick the speech-makers, flag-wavers, and phrase-makers out of our legislative bodies and elect engineers, who will address themselves to the problem of running the country.

And some day our schools and churches will likewise be put into the hands of practical engineers, who shall produce results."

Therefore, if we would reduce the cost of engineering education to our students, we must improve the quality of our delivery and so change the content matter of our courses that the student will be given the greatest possible opportunity and will be prepared to meet the demands expected of him as is indicated by the views expressed in this editorial and by expressions of similar character heard in many directions.

R. G. TYLER, Dean School of Engineering, Oklahoma Agricultural and Mechanical College. It may be interesting to this section to know what Oklahoma Agricultural and Mechanical College has done toward reducing the cost of education to the student. We have done away with all fees, except a student activity fee, aggregating \$9.00 per year per student, and a breakage deposit of \$7.50 per year which is returnable to the student under the usual conditions. There is no tuition, medical, or matriculation fee. Some schools have free tuition and yet charge various laboratory fees in order to pay for materials used up in the laboratories. We do not see the distinction between a laboratory fee and a tuition fee and believe that if the State pays one it should also pay the other.

In regard to textbooks, the college operates its own bookstore and books are sold to the students at cost. The cost of the textbook does not include labor, cost of handling, etc., as the salaries of employees are paid out of the regular budget.

The dormitory facilities are not sufficient to take care of a very large number of students but rooms in the dormitories may be had for \$3.00 per month per individual. Maintenance and operation is all that is charged up against these dormitories.

The college operates a cafeteria for the benefit of students and faculty on a cost basis. A large amount of the materials used, such as the meat, etc., is produced on the college farm of 1,000 acres immediately adjoining the campus. About 600 people are served at this cafeteria, as a rule, during the present year and the average cost per student per day is about 75 cents. A 15 cent plate is served for those desiring this and this plate consists of a meat, two vegetables, bread and butter, dessert, and milk, tea, or coffee. This plate is arranged so that it will only cost the college 15 cents, so that the service operate without loss.

The following paper was presented by Dr. C. R. Mann of the General Staff, War Department:

#### THE IMPROVEMENT OF ENGINEERING EDUCATION

By C. R. MANN

The land-grant colleges are the most interesting of all-American educational institutions. They were founded to realize a demand for an American type of training, which began with the landing of the Pilgrims in America and which has continued with increasing force down to the present day.

The Morrill Act was the embodiment in legislation of an insistent demand for a type of training suited to the pioneer spirit of America, and adapted to release the creative energy of America in productive work.

The most explicit statement of the objective these colleges were founded to attain is found in the transactions of the Illinois Farmers' Association. It is expressed in the following words: "The most natural and effectual mental discipline possible for any man arises from setting him to earnest and constant thought about the things he daily does, sees and handles and all their connected relations and interests."

For the past sixty years land-grant colleges have been working toward the achievement of this ideal. Steady progress has been made, but much yet remains to be done. The industries of the country are still far from satisfied with the results achieved by technical training.

An encouraging sign of recent progress is the formation of local chapters of the Society for the Promotion of Engineering Education and their lively interest in questions of methods of teaching. There is no doubt that a great deal can be accomplished without changing the curriculum, by encouraging the teaching force to study their methods of handling the class and laboratory work. The gradual adoption of project and problem methods of presentation is a gratifying sign of advance toward the desired goal.

There is, however, another phase of the subject which is quite as important as the method of treatment. This is the content of the courses. For the project method is always open to the danger of occupying the student's time with particular phases of the subject and not giving him a well-rounded conception of all the fundamental ideas and principles which he should grasp.

In order to meet this second requirement for well-rounded content of subject matter, it was suggested in the Engineering Report that an analysis should be made to discover what subject matter was common to all branches of engineering. It was further suggested that this subject matter should occupy the time of the first years of the course and should be taken in common by all types of engineering. After each engineer had mastered the fundamental mathematics, physics, mechanics and laboratory work required for practice in any field of engineering, specialization might begin.

So far as I am aware, very little progress has been made toward this fundamental analyses. Yet it is quite as important as is the improvement in methods of handling the subject matter. It is obviously desirable that we know exactly where we are going, as well as understand the methods by which we are to get there. From purely theoretical grounds, the necessity for specification in detail of the things that must be accomplished is obviously needed.

Objection has been made that the specification of the things the engineer must be able to do, and the things he must know, can not be made because the activities of engineers are so varied and complex. Experience in the army has, however, proved that this is not the case. During the war, when hundreds of our best educators were called upon to create a thorough and rapid method of training technical men for military service, it was found that the first requirement for effective work was the setting up of accurate specifications of exactly what the men must be trained to do.

Since the war, the army has been studying the work done by these educators during the war, and has produced courses of instruction, which are vastly more effective than those designed without clear-cut specifications of the objective. For example, in training telegraph operators, the Signal Corps School at Camp Vail is now producing better operators in four months' time than were produced a few years ago in ten months. The difference has been brought about by careful specification of the objective, and detailed study of methods that enable the student to achieve the objective.

The difficulty with this method of procedure lies in the fact that it takes time and much patient study of details. It is much less easy than the ordinary procedure of studying college catalogs and debating in faculty meeting concerning the number of hours that may be allotted to this, that, and the other subject. Therefore, although the idea is extremely simple and obviously sensible, it is hard to realize in practice, because teachers are too busy to put in the time required for the kind of specification and analysis work that is needed. It is, however, evident that substantial progress waits on applying engineering methods to the study of the curriculum and on writing the detailed specifications and analyzing them into the definite steps that must be taken to realize them in practice.

It encouraging to report that the American Association of Engineers has reached the conclusion that this process is necessary to progress. A committee has recently been appointed to study the actual activities of engineers, and on the basis of such study to write specifications of the things engineers actually do and must know in order to achieve the work assigned to them. Such work is fundamental for any real progress, and until the engineering schools generally undertake it, the achievement of better results of training will advance slowly.

Another important feature of progress in engineering training has to do with the humanistic side of the program. There is insistent demand from the industrial world for better comprehension of human relations among engineering graduates. They need more thorough grasp of economic principles, of social organization, and of industrial relations. They need a firm grasp of the underlying principles of our Constitution and the essential characteristics of American institutions.

To meet this demand the Engineering Report recommended that approximately a quarter of the college time be devoted to studies of this sort, and that discussion of relative values and costs be introduced wherever practical in technical work. The progress that has been made in this direction is, however, not encouraging.

The army has been experimenting in this field also. Soldiers are better soldiers if they have livelier appreciation of their relations to their fellows, and of the service they are working to render. Hence, there has been developed within the army, a series of thirty-three lessons for recruits, designed to develop right attitudes toward their comrades, toward the army as a whole, and toward the country. These lessons have been worked out by a long series of experiments with soldiers and have just been issued for use throughout the army.

In instruction of this sort, it has been found efficient to handle the subject matter in the form of discussions of concrete cases, or episodes, that require grasp of a complicated situation, and the formation of judg-

ment leading to action. The same methods and principles can be applied to the humanistic work in engineering schools with like results. But here again, study and detailed analysis is required and considerable experimenting with classes before reliable results can be secured. The game is, however, well worth the candle. The country demands this sort of training of its technical men. Proper development of it will bring large rewards.

In closing, let me point out that there lies before the colleges of the country at the present time, the finest opportunity for service that ever existed. The idea has been advanced on numerous occasions recently, that there is need for an impartial tribunal to furnish Congress and the public reliable information concerning all kinds of municipal, state, and national activities. For example, the new tariff law has been put into operation. Are its results beneficial to all concerned? In what respects are they good and where are they working injury?

It is not possible for commercial organization, or consumers' leagues, or political agencies to obtain valid information because each approaches the problem from a biased point of view. The colleges and universities, however, can tackle such problems from the point of view of discovering the truth, and hence their findings would have far more influence in settling these vexed questions. Such service would be real service to the State and the Nation and would supply the institutions with the best possible materials and methods of instruction. Nothing would stimulate more interest in a class, or give more vital experience than a real study of some of these burning questions of the day. If the colleges do not take up this work, other agencies less qualified will undertake to render this service, and the colleges will lose their opportunity for public recognition and the large rewards that come from service well done.

To sum up: I hope it is clear that I am not advocating a revolution, but merely a more rapid evolution than has taken place in the past. By the ordinary processes of nature, the honeydew melon might have developed in a thousand years, but scientific methods made it possible to create this new species in a relatively short time. All I am advocating is the application of engineering methods to the problem, with the assurance that rapid progress will result. The engineers have produced the railroad, the automobile and the aeroplane. Why should we walk in education, or ride a mule, when we can travel much more rapidly and comfortably by means of the product of our own genius, the engineering method of attacking and solving problems?

#### DISCUSSION OF DR. MANN'S ADDRESS

L. E. BLAUCH, United States Bureau of Education. The discussion by Dr. Mann is in keeping with the general present day attempts to remake and adjust the curricula of our various schools to modern conditions. Many of our curricula are much like Topsy—"they just grewed"—and that by the mere accretion of a large amount of new subject matter. So much material is now available for instruction and so limited is the human mind in its ability to take it all in that some principles of selection must be determined and applied. The method pursued by those who are trying to build curricula in a scientific way is, first, to determine certain specific and clearly defined objectives which are to be the outcome of training,



that is, to translate the general purposes of training into tangible goals, and, second, to determine what experiences the learner must engage in to arrive at those goals. It is a difficult, because an enormous and detailed, task, but by concerted effort it will undoubtedly result in greater economy of learning and in a better final product. The method is one of the most hopeful contributions of the scientific study of education.

Another matter of considerable import in the improvement of engineering education is the relation between instruction and research. Research in universities and colleges may for convenience be considered as of two types as determined by its purposes. First, a certain amount of research is carried on by instructors and encouraged by institutions of higher learning primarily for the professional improvement of the instructor. Frequently promotions are more or less dependent on the research contributions which a member of the faculty makes. The practice may or it may not be justifiable, depending on the individual. There is by no means any guarantee that engaging in research produces better instruction on the part of the faculty member. The fact is that there is a fundamental psychological difference between the mental attitudes necessary for instruction and those involved in research. The investigator is interested primarily in results, that is, in the discovery of new truth, while the teacher directs his attention primarily to the processes by which the mind arrives at conclusions. The investigator has little interest in the mental processes by which he arrives at truth other than as those processes validate his conclusions, usually a small matter, as there are usually safer and more objective criteria by means of which to check those conclusions. It is not at all unusual to find excellent research men who fail miserably in their teaching and it is quite as usual to find excellent teachers who could not be very successful as investigators. In considering the place of research work for the professional benefit of the instructor a distinction may well be made between the young instructor, who is relatively inexperienced, and the older instructor, who is highly specialized and who has quite fully mastered his field. The young instructor will probably profit more as an instructor by further study under masters than by technical research, while the master to grow must probably engage in advanced investigation. The whole purpose of this discussion is not to settle any questions but rather to raise the issue whether research should be made prominent in the promotion of faculty members and whether either teaching or research should not be rewarded for its own services.

A second type of research is primarily for the results which the investigation yields in the form of new knowledge. It is organized more or less independent of any instruction. Its fact, to tie it up too closely with teaching is likely to yield poor research results. Only recently my attention has been called to an excellent investigator in agricultural chemistry who was being spoiled as an investigator because he was doing too much teaching. Research ability is too rare to be allowed to dissipate itself in such manner. Teaching is a regular stated performance. There is no way of avoiding its regular occurrence. Its tasks are arduous and compelling if they are seriously and well performed. When teaching and stated research are carried on by the same persons at the same time, one or the other, or perhaps both, tend to be done in an inferior way. There is, however, a form of instruction which the investigator can and almost

necessarily must do if it is to be done at all—the carrying on of seminar courses whose primary object is to direct the research of students.

Sooner or later the relation between research and teaching in engineering will have to be discussed by this association. Already more than twenty land-grant colleges have definitely organized their engineering research in engineering experiment stations. If these stations are to make their greatest contributions they must proceed seriously with the work of research rather than to carry it on as a side show, while the work of instruction holds the center of the stage. To do both the teaching and the research as they should be done will perhaps require a considerable amount of, though not a complete, separation. The experience of the agricultural experiment stations on this point can well be studied with profit.

CALVIN H. CROUCH, Dean of Engineering, New Hampshire College of Agriculture and Mechanic Arts. The subject of improvements in engineering education comes up for discussion annually at such meetings as this, for the engineering field is constantly expanding and we must be constantly on the lookout for ways to improve the training given our students, that it may best meet the needs of the times.

The engineer is beginning to take his place in community life and is taking charge of the executive and managerial ends of industrial and engineering enterprises, as well as solving their technical problems, so that his training must necessarily be different from that needed fifteen or twenty years ago, when he confined his energies largely to the technical problems. These new demands have been thrust upon him, I believe, because it has been found that when assigned problems he has acquitted himself well; he has analyzed the problems, going straight to the hearts of them and solving them without resorting to cut-and-try methods. His training has made him study cause and effect so that, given a condition, he is able to reason backward and determine causes, or vice versa, with a certainty and precision that frequently surprises those who have not had the benefit of a training obtained by a study of the exact sciences. In other words he has been taught to reason and think for himself and to apply his knowledge in the solution of problems, and this I think, is the object of his training or education rather than to accumulate knowledge.

The engineers' success has been such that we are justified in believing that our present engineering training has much to commend it in spite of the many adverse criticisms. We should, however, recognize that conditions are changing and from time to time modify our curriculums accordingly. The chief problems confronting the captains of industry today are economic and social, so that the importance of an insight into these problems are brought home to us with special force at this time. Most of us, I dare say, are awake to the situation, but the problem as to how we can introduce the desired non-technical subjects into our over-crowded curriculums, without causing more harm than good, is a difficult one to solve unless we lengthen the course.

We hear many criticisms of our engineering training, some of which are just and many, I believe, are unjust, but before making radical changes it would be well to ascertain wherein the present training has fallen short. In connection with this I may state that a committee consisting of representatives of the industries and educational institutions is at work on this

problem, and with the spirit of cooperation being manifested I hope much good will come from it.

We should aim to turn out a product which the industries can not only absorb, but one which in the course of a few years they can promote into the more responsible positions of captains of industry rather than into those of lieutenants and sergeants. A considerable pressure has been exerted to induce us to dilute our curriculums with non-technical courses and with courses aimed to fit students to enter the lower positions in the industries, in brief, to make handbook engineers or a sort of a trade school product. I think we should go slow in such dilution if made at the expense of the fundamental courses in mathematics and the exact sciences.

As I view this part of our problem, we have two avenues open to us, one is to change our engineering courses to cover say five years, and the other is to offer courses leading to appropriate degrees, the curriculums of which should call for thorough fundamental courses in mathematics and the exact sciences, and the application of them to engineering problems and at the same time offer a sufficient range of electives to enable one to get such courses in economics, history, accounting, sociology, psychology, etc., as may seem best to enable him to fit himself for some particular field.

While the five- or six-year course may be the best solution of the problem, until we come to such an agreement and adopt such a course, the smaller institutions will doubtless have to confine themselves to four-year curriculums and meet the situations in some such manner as already indicated.

At New Hampshire College we have endeavored to solve this problem by offering such a course as the one just described which we call an industrial course. It has much in common with the regular engineering courses but has a wider range of electives from prescribed lists of electives. If the student wishes to become a sales engineer, to fit himself to enter the production end of an industry, or to teach under the Smith-Hughes Act, he is advised to take the industrial course. What the future of this course is to be, is not known, as it is but three years old, but the enrollment is increasing. We put in safeguards to prevent this course from becoming one into which those students would gravitate who are unable to keep the pace set for the regular engineers.

While I think we should consider the matter carefully before materially changing our curriculums, I believe we should change them to meet the needs of the time. Personally, I would like to see courses in economics and English, and possibly accounting, in every engineering curriculum. At New Hampshire College, English is and has for years been required throughout the freshman year, but I hope to have our curriculums revised this year so as to get in an additional year of advanced rhetoric and oral and written argumentation and exposition, to be given during the junior or senior years when the students will appreciate the importance of it. Engineers are said to be notoriously deficient in the use of English. The man with such a deficiency is greatly handicapped, for while one may not need English to help him solve his engineering problems, in presenting a matter to a board of directors he who has a good command of English and knows how to properly arrange his arguments will be more likely to carry his point than the man who is not so equipped. Some recent ex-

periences with graduates of some of our largest schools have recently called my attention to this deficiency, for letters received from them were scarcely worthy of the efforts of a grade school student; they were in poor form, had poor spelling and bad grammar. They indicated a condition that should have called for drastic action before the student was allowed to graduate.

Another criticism of our engineering training is that our graduates do not know how to make reports. Just how true this is I can not say, but at New Hampshire College, in the fall of 1919, we had difficulty in getting satisfactory reports and they were slovenly written and in poor form. We have started a campaign to correct this and are insisting that all written work handed in must be neatly written, the material logically and systematically arranged, or it will be penalized in grading or not accepted. It is having the desired effect, as evidenced by laboratory reports recently examined.

While economics is not listed as a required subject in the engineering curriculum at New Hampshire College, it is listed as an elective, and scheduled at such a time as to fit into the engineers' schedule, with the result that most of them take it.

There are other ways of improving our engineering education besides revising our curriculums, such as selecting more competent instructors with broader practical experiences, by not overloading them and by improving our method of presentation; and by the latter I do not mean giving physics by the lecture method, or by the instructor working out in the class, problems for the students in mechanics or mathematics.

In connection with the lecture method of teaching physics, I have had an interesting experience at New Hampshire College. For some years past the engineering students have been given thorough courses in physics, consisting of recitation and laboratory work. I think they have been getting what they needed, but the physics given the students in the agricultural and the arts and science divisions had, until two years ago, been given by the lecture method, with occasional examinations. It seemed to me a crime to treat students in this way. They were doubtless being entertained, and possibly instructed, by the professor, but just how much they retained it is difficult to say, but probably not much as compared with what they retain now.

Last year this course was changed so as to consist of one lecture, one recitation, and one laboratory period per week, with the result that the students taking it have a real interest in the work, and I am told by the professor of physics that they are getting twice as much physics as formerly and are getting it more thoroughly. The students who elect physics are enjoying the work and appreciate it. We have not, however, as many students electing physics as formerly, for it is well known that they have to work in this course. The change has been a very satisfactory one with us and is appreciated by both faculty and students.

TUESDAY AFTERNOON, NOVEMBER 21, 1922

The session was devoted to engineering research.

## THE VARIED ASPECTS OF RESEARCH

Dr. Robert S. Woodward of the Carnegie Institute of Washington delivered a very able and instructive address on this subject, in which he summed up his conclusions from his life-long experience in research, but announced that he was not ready to publish these conclusions.

## DISCUSSION OF DR. WOODWARD'S ADDRESS

W. K. HATT, Director, Advisory Board on Highway Research, National Research Council. I find it difficult to draw a line between the fields of so-called abstract or academic research and so-called "industrial" or "engineering" research. Each must advance, if at all, by scientific methods. Considered as a class, set apart by their taste and aptitude from the class of producers and constructors, research workers are of a family. They benefit by family life.

Some of the family are devoted to immediate needs; to saving coal in the management of the furnace; to designing balanced diets for the the economical and complete feeding of the family; others are learning how to preserve the normal activities of the body and the mind; while others are on the house tops seeking to solve the mystery of the stars. Industrial researchers are the Marthas of the home. There is but little romance attached to the work of the industrial researcher. He is usually one of a group working in a self-imposed limitation of controlled environment, and I have no doubt he often envies his free-ranging and individualistic brother, who at times, like Cortez in Keats' sonnet, stands silent upon a peak in Darien:

"Then felt I like some watcher of the skies  
When a new planet swims into his ken;  
Or like stout Cortez when with eagle eyes  
He star'd at the Pacific—and all his men  
Look'd at each other with a wild surprise,  
Silent, upon a peak in Darien."

My lot has been cast in with those who experiment or perform research in groups; with a program fixed in advance, and an organization to carry it out. Some of the individuals of the group are only required to be painstaking and faithful observers, to be devoted to their task of measurement with precise instruments, whether in the heat of summer's sun or the freezing weather of winter, in confined situations and fatiguing postures. Others have envisaged the problem, organized and secured support for its solution; they may have prepared a working plan, or left that to others. I do not know where to draw the line to separate these from observers. I would suppose that the quality of the research worker is a spiritual quality, and is not measured by specific actions.

"Et je songeai que la grande vertu de l'homme est peut-être la curiosité. Nous voulons savoir; il est vrai que nous ne saurons jamais rien, mais nous aurons du moins opposé au mystère universel qui nous enveloppe une pensée obstinée et des regards audacieux; toutes les raisons des raisonneurs ne nous queriront point, par bonheur de cette grande inquiétude qui nous agite devant l'inconnu." ANATOLE FRANCE, *La Vie Littéraire*, Vol. 3.

To me there is a clear distinction of kind between the research type of man and the other type of man who has an instinct for controlling others or for production, just as there is a distinction between the teacher and the registrar, or between the government scientist and the chief clerk of a bureau.

If one were to attempt a definition, it would gather together in a composite description ideas derived from several sources.

(1) Research work may be in industrial *fields* with a definite aim or in abstract science without thought of particular use.

(2) The research may lie in the field of any branch of knowledge that is treated in a scientific spirit, including, of course the natural sciences, but not excluding mathematics, history, economics and medicine.

(3) The *method* may be by deduction, based upon natural phenomena, and always referenced thereto, or by induction, using the methods of modern experimental science, both to discover new facts or uncover underlying laws, or the determination of the mechanism by which one event follows another, resulting in a substantial addition to the existing body of knowledge.

(4) The *qualities* by which true research are known are, earnestness, devotion, diligence and system, and, in highest form, original and creative work.

(5) *Recognition* should be given to skill and initiative in devising suitable methods and apparatus for use in observations, and care and devotion shown in difficult observations, skill in arranging and interpreting data, or forming generalizations upon them.

(6) The *result* should be the discovery of something hitherto unknown.

The following are activities and workers not considered:

(1) The work of the mere routine worker without initiative or responsibility.

(2) The manual operations of the mechanic.

(3) The work of the purely critical and negative mind.

(4) Purely regulatory functions.

(5) Those with only an amateurish and discontinuous interest in research.

(6) Those with only the acquisitions of the learned scholar who may have absorbed the results of research.

(7) Inventors, unless they are scientists.

#### COORDINATION

One aspect of research work is troublesome, viz., the proper balance between the necessary control by an organization and the individual initiative of the research worker.

Certainly some accommodation must be secured in the interest of harmony and progress.

I am thinking now of large research projects attached to the construction of highways, where large expenditures, amounting in some cases to \$200,000 are involved; an organization of researchers comprising various degrees of experience, from routine observers and recorders up to those who conceive and plan the researches, and are responsible for the scientific

conclusions and the success attending the expenditure of such large funds. There are also individuals whose services are necessary for the orderly progress of the work, considered as a production job.

Somewhat the same situation obtains in an organization like Forest Products Laboratory at Madison, Wisconsin, where there are hundreds of workers, and scores of projects which are begun only after a statement of definite purpose, a working plan, and appropriation of funds, followed up by accounting system, not only for expenditures, but from the standpoint of production. The problem here is to provide an effective organization without dampening the initiative of the individual, killing his imagination and destroying that sense of criticism and responsibility which are necessary if large projects in an unknown field are to arrive at useful and significant conclusions.

Viscount Bryce has discussed this conflict of the individual with organizations very clearly in the preface to his *Modern Democracies*.

It is plain that research in highway transport, for instance, commands the combined efforts of the highway engineer, the automotive engineer, and organizations that are able to collect reliable statistics of costs. The following outline of cooperative program of research in the field of highway transport is offered as an example of desirable cooperation.

#### A. *Research for Automotive Engineers:*

##### 1. By laboratory tests:

- (a) To determine fuel, oil and grease consumption and power development of vehicle and from these to calculate the performance on various surfaces and grades, and the excess power for moving trailers. See Michigan State Highway Department Investigations of Truck Performance on Grades, by Victor R. Burton, Walter E. Lay, and Frank F. Rogers.
- (b) To study the effect of improved grades on the design of the power plant of the vehicle.
- (c) To consider the design of the vehicle in order to impose on the road the minimum loads for specified capacity of vehicle.
- (d) To study the lighting system of autos with a view to safety, and the mechanisms indicating intentions of the driver.

#### B. *Research for Highway Engineers:*

1. To find rolling and air resistance of motor vehicles at various loadings and speeds on types of road surfaces and curves; limit of adhesion.
2. To determine the loads imposed on road surfaces by various vehicles, with various tire equipment at various speeds.
3. To discover the stresses and strains acting in various road surfacings under the expected loads, and the properties and improvement of subsoils.
4. To determine capital and maintenance costs resident in the road.
5. To determine the laws governing the increase of highway traffic by basic surveys of flow of traffic in typical regions.

#### C. *Research for N. A. C. C. and Auto Associations:*

1. To assign schedule cards to a selected group of, say, 200 passenger drivers for each condition, to obtain operating expenses on the average for:

- (a) Three classes of cars;
- (b) Regional conditions,  
Macadam and gravel roads,  
Dirt roads,  
Paved roads;
- (c) Topography,  
Level,  
Hilly.

2. To study records of truck and passenger bus fleets to obtain similar data.

**D. Locating Highway Engineer:**

Given road resistance, power available at wheels, speeds, fuel, oil, and grease consumption, tires, repairs, driver's time, depreciation, overhead, expected traffic.

To find relation between capital costs of construction and operating expenses on roads of various surface and grades (length and rate).

**E. Federal Agencies:**

- 1. To study movements of commodities and passengers by highway and railway in the interest of coordination of transport.
- 2. To study the financing of highway improvements in the light of experience and science in related fields of financing of public improvements.
- 3. To study the effect of highway improvements on regional industries.
- 4. To study the effect of highway improvements upon general productivity of men and industries.

**F. Advisory Board on Highway Research:**

To evaluate progress in the several fields of highway research by an analysis of completed and current projects; to outline needed researches; and to assist existing organizations to correlate their work in the light of a comprehensive program; and to publish bulletins of information on methods and technique of research, and on progress in the several fields.

**GENERAL OBSERVATIONS**

(1) Experimenters are reluctant to display the results of their work to the public eye, sometimes with the fear that other men will purloin their results, but more often it seems to be an over caution lest the experimenter should be betrayed into premature conclusions. On the other hand, large and expensive projects must be supported by contributions from public funds and from the industries, and it is very difficult to secure continuous contributions unless there is some evidence of progress along definite lines to a previously described objective.

(2) The apparent lack of objective, and failure of various experimenters in the same field to understand the purpose and limitations of their work has impressed me. For instance, in the research into the resistance that roads offer to the passage of motor vehicles, it is easy to distinguish, in the total operating resistance of the vehicle, between the resistance arising from the surface of the road and the resistances which are present in the vehicle itself, the tires, differential, transmission, engine, etc. Measurements may be made on gasoline consumption and other perform-



ance factors. Now it would seem that if that resistance which is peculiar to the surface of the road is to be measured, there should be some standard vehicle, and the measurements should be entirely separated from the measurements of the performance of the individual vehicle. Yet the average experimenter will start out with an illy defined field of measurement without having an analysis of his problem and a definition of the particular field under examination.

(3) I am also impressed with the lack of critical study of instruments of measurement, such as gauges, extensometers, etc. Men attempt to purchase these as standard equipment when they really are not standard, and it may be that what is disclosed in the observation is not the inherent mechanism of the phenomenon under observation, but simply a record of the behavior of the instrument.

(4) Attention is called to the danger of over-refinement of laboratory tests on materials of construction which may easily impose laboratory standards on road materials which are not reflected in the service value of the road. It is important that laboratory men should have an opportunity to observe the operation of structures and materials which they are testing.

(5) The value of ordinary field tests of materials is plain as a stimulus to better workmanship on the part of constructors, or better supervision on the part of the engineers. In the case of concrete roads, tests on manufactured concrete are used as a measure of the respective performances of men on adjoining sections of the work.

(6) There is a tendency to accumulate large volumes of data and continue experimentation without a searching analysis of the results, and without a determination of the relative importance of the particular project in the field of research.

(7) Since the purpose of much industrial research now under way is to improve practice, it is important that results should be communicated to industry. I would attach to each large research organization an application function. Constructors and producers often are unaware of the existence of truth derived from research that should be of vital interest to what they are doing.

(8) Allow me to mention one by-product of research work, namely, the bringing together of men of apparently conflicting interests and those in controversy arising from misconceptions. Against the background of research, and a common effort to determine facts, acrimonious disputes are quieted, mere opinions are held in abeyance under the benign influence of the research for truth. The promoter and salesman drift into the background.

(9) One aspect of tests of field construction on a large scale presents a difficulty in that these tests are in the public eye and are often of an experimental nature in which constructions are loaded with a view to failure. These expected failures may be twisted by interested persons to mislead the layman, and be represented as a normal case. Again, in such tests of construction, deformations become evident for the first time and which when known permit the designer to provide for them intelligently. And yet these deformations may be wrongly used as an argument against the type under study, rather than as a basis for improved designs of this type. It is this aspect of experimental roads which may explain the reluctance of producing interests to cooperate in such research work.

(10) The large scale experiments demand cooperation between industry, the engineer and the trained researcher. There is always a danger of attempting too much. The program is subject to a change of plan during the test, because apparently no one is wise enough to foresee all conditions, in an unknown field. Yet with all these drawbacks, probably the most useful field of research is in the examination of the fundamental laws governing the behavior of constructions. A fruitful field of research is on subsoils, finding out what characteristic of each soil it is that determines its properties and evaluating them so that an engineer can examine a soil and then intelligently design a road to carry the load over the soil, or know what to do to improve its supporting power. Another example is the study of the laws of deformation of stiff slabs under loads, and the methods of reinforcing these economically.

(11) A recent bulletin of the Advisory Board on Highway Research of the National Research Council lists some 479 projects in the field of highway research, undertaken by universities, State commissions, industrial laboratories and Federal departments. A lack of intercommunication is evident, and several States may be engaged in the endeavor to answer the same problem, often a simple problem. Coordination of such researches is desirable.

The following report was submitted for the committee by its chairman, Anson Marston, Director Engineering Experiment Station, Iowa State College:

#### REPORT OF COMMITTEE ON ENGINEERING EXPERIMENT STATIONS AT LAND-GRANT COLLEGES

This standing committee on engineering experiment stations was established in 1920, by action of the Executive Committee of the Association of Land-Grant Colleges, taken in accordance with recommendations of the Section of Engineering, which was given verbatim in our first annual report.<sup>1</sup>

The term of membership on the committee of Dean A. A. Potter expires this year, and the appointment of his successor will fall to the incoming administration of the association.

Since January, 1921, the committee has been publishing quarterly a mimeographed publication edited by the secretary in the interests of engineering experiment stations at land-grant colleges. Upon recommendation of the Section of Engineering the title of Engineering Experiment Station Record has been adopted for this publication since November, 1921. Eight numbers in all have now been issued.

The expense of the work of the committee has so far been very small, owing to the devotion of the secretaries, who spent only \$53.63 in 1920-21, and only \$178.39 in 1921-22. All bills submitted have been paid promptly and cheerfully by the Executive Committee of the association.

A principal function of the committee has been the constant collection of news of engineering research and its prompt publication in the Engineering Experiment Station Record. In accordance with the precedent established last year special information blanks were sent out this fall, and from the returns the following table of data is presented:

<sup>1</sup> See Proc. 35th Ann. Conv., Assoc. Land-Grant Colleges, 1921, p. 289.

STATISTICS OF ENGINEERING RESEARCH AT THE LAND-GRANT COLLEGES OF CONTINENTAL  
UNITED STATES, NOVEMBER, 1922

State	Engineering experiment station, date founded	Annual engineering research fund			Engineering research staff			Engineering research bulletins	
		Appropriation by legislature	Allotted by college	From other sources	Full time	Part time paid	Part time, no extra pay	Total Dec. 31, 1922	Jan. 1 to Dec. 31, 1922
Alabama	<sup>1</sup> None	0	0	0	0	0	1	0	0
Arizona	<sup>2</sup> None	0	?	0	?	?	?	?	?
Arkansas	1921	0	0	0	0	0	3	0	0
California	<sup>4</sup> None	0	?	?	0	4	4	18	0
Colorado	<sup>5</sup> 1919	\$11,305	0	0	2	3	3	15	2
Connecticut	None	0	0	0	0	0	0	0	0
Delaware	None	0	0	0	0	0	0	0	0
Florida	<sup>6</sup> None	0	0	0	0	0	0	0	0
Georgia	<sup>7</sup> None	0	?	?	?	?	?	0	0
Idaho	<sup>8</sup> None	0	\$2,500	?	1	0	1	?	0
Illinois	1903	0	77,570	\$25,000	21	12	25	133	9
Indiana	1917	0	\$25,000	\$8,750	9	4	6	9	1
Iowa	1904	45,000	0	\$10,000	7	19	10	64	4
Kansas	1910	0	<sup>10</sup> 7,000	0	2	2	26	12	1
Kentucky	None	0	3,000	0	1	0	4	?	?
Louisiana	<sup>11</sup> None	0	0	0	0	0	?	0	0
Maine	<sup>12</sup> 1915	0	0	0	0	0	0	7	0
Maryland	1920	0	<sup>13</sup> 3,500	<sup>13</sup> 3,500	0	5	4	0	0
Massachusetts	<sup>14</sup> 1919	0	72,000	102,000	30	0	100	14	14
Michigan	<sup>15</sup> None	0	500	0	0	1	0	0	0
Minnesota	<sup>16</sup> 1921	0	7,800	100	0	3	13	3	2
Mississippi	None	0	0	0	0	0	0	0	0
Missouri	1909	7,500	0	0	0	2	4	22	0
Montana	<sup>17</sup> None	0	0	0	0	0	?	0	0
Nebraska	<sup>18</sup> None	0	0	0	0	0	?	0	0

<sup>1</sup> Alabama Polytechnic Institute has reported several definite engineering research projects under way.

<sup>2</sup> A State Bureau of Mines was established in 1915 at the University of Arizona by the legislature. The engineering dean is director. Annual income \$38,000—from university. Employs 5 full time and 5 part time men in work on matters connected with Arizona's mineral industries, including geological and metallurgical research. Eight bulletins are published per year. In addition, the agricultural experiment station conducts irrigation research.

<sup>3</sup> Arkansas will ask legislature this winter for \$10,000, but prospects are uncertain.

<sup>4</sup> California conducts engineering research irregularly, using university funds specially allotted from time to time. The university division of publications has an engineering section, whose publications are not necessarily research. In addition, the U. S. Bureau of Mines for some years has had a mining experiment station in the mining building.

<sup>5</sup> Engineering division of Colorado experiment station, which includes agricultural research. The engineering dean is vice-director of the entire station.

<sup>6</sup> Florida has reported some definite research projects under way and is planning the formal organization of an engineering experiment station as soon as practicable. Action has been delayed by unfavorable conditions.

<sup>7</sup> Georgia has reported definite engineering research under way, but reports no regular allotment of funds. Hence, staff reported is omitted till after further correspondence.

<sup>8</sup> The research reported in the table at the University of Idaho is in the civil engineering department road materials laboratory. In addition, the State Bureau of Mines and Geology was located at the University of Idaho in 1918 by act of the legislature, with the dean of the school of mines as secretary ex-officio and director by appointment. Its annual income is \$15,000 from the State, \$5,000 from the university and \$12,500 from other sources. It employs 5 men full time, 5 men half time, and 3 men part time without extra compensation, and engages actively in engineering research in its special fields (several definite projects have been reported) in cooperation with the School of Mines of the University and either the U. S. Bureau of Mines or the U. S. Geological Survey.

STATISTICS OF ENGINEERING RESEARCH AT THE LAND-GRANT COLLEGES OF CONTINENTAL  
UNITED STATES, NOVEMBER, 1922—*Concluded*

State	Engineering experiment station, date founded	Annual engineering research fund			Engineering research staff			Engineering research bulletins	
		Appropriation by legislature	Allotted by college	From other sources	Full time	Part time paid	Part time, no extra pay	Total Dec. 31, 1922	Jan. 1 to Dec. 31, 1922
Nevada	1921	0	300	0	0	0	6	0	0
New Hampshire	None	0	0	0	0	0	0	0	0
New Jersey	<sup>19</sup> None	0	0	0	0	0	0	0	0
New Mexico	<sup>20</sup> None	0	0	0	0	0	2	0	0
New York	<sup>21</sup> None	0	7,200	4,300	2	0	3	<sup>21</sup> 0	<sup>21</sup> 0
North Carolina	<sup>22</sup> None	0	0	0	0	0	0	0	0
North Dakota	<sup>23</sup> None	0	0	0	0	0	4	0	0
Ohio	1913	10,000	0	3,000	2	2	14	20	0
Oklahoma	<sup>24</sup> None	0	0	0	0	0	3	0	0
Oregon	<sup>25</sup> None	0	0	0	0	0	3	0	0
Pennsylvania	<sup>26</sup> 1915	0	13,040	0	5	3	6	0	0
Rhode Island	<sup>27</sup> None	0	0	0	0	0	?	0	0
South Carolina	<sup>28</sup> None	0	0	0	0	0	?	0	0
South Dakota	None	0	0	0	0	0	0	0	0
Tennessee	1921	0	1,000	1,000	0	1	6	1	1
Texas	1914	3,000	0	0	0	0	?	3	0
Utah	<sup>29</sup> 1918	0	0	0	0	0	0	0	0
Vermont	1922	0	1,500	0	0	1	2	0	0
Virginia	1921	0	700	0	0	0	3	0	0
Washington	1919	0	5,500	0	1	0	7	11	5
West Virginia	1921	0	6,000	0	0	0	6	1	0
Wisconsin	<sup>30</sup> 1914	0	7,000	0	1	10	27	59	0
Wyoming	None	0	0	0	0	0	?	0	0
Totals—22 Stations		\$76,805	\$241,110	\$157,650	84	68	279	410	28

<sup>9</sup> Approximate.

<sup>10</sup> Some additional income from fees for tests.

<sup>11</sup> The recent constitutional convention of Louisiana made liberal provision for engineering buildings, which are now being erected as rapidly as possible on the new site of the University of Louisiana. After January 1, 1924, the appropriation for support and maintenance will be more than doubled. Dean of Engineering Thos. W. Atkinson states that at that time the university will no doubt organize an engineering experiment station.

<sup>12</sup> Engineering research was proceeding actively at the University of Maine until stopped by the war. "It is the expectation that in the near future it will be possible to obtain funds to develop the work from the point where it was left off."

<sup>13</sup> The distribution of engineering research funds at the University of Maryland was not stated as between university and other sources. The station is carrying on highway research in cooperation with the State Highway Commission of Maryland and the U. S. Bureau of Public Roads, and the total amount of funds stated is approximate only.

<sup>14</sup> The division of industrial cooperation and research of the Massachusetts Institute of Technology, which practically is an engineering experiment station.

<sup>15</sup> In lieu of bulletins, however, each experimenter publishes in current journals.

<sup>16</sup> The Engineering Experiment Station of the University of Minnesota hopes to receive a definite appropriation from the legislature this winter. Two bulletins are ready for publication.

<sup>17</sup> The State Board of Education of Montana has approved the creation of an engineering experiment station at the State College of Montana with regular budgets for the two years beginning July 1, 1923, and the matter goes to the State legislature in December, 1922.

<sup>18</sup> One of the engineering professors at the University of Nebraska is working on a helium production research for the U. S. Bureau of Mines.

<sup>19</sup> Rutgers College reports, "Although we have no engineering experiment station at present, the staffs of the engineering departments are favorable to the creation of such a station here. In fact, this is one of the very important matters that must be accomplished."

Comparison of the statistical data given in the above table with similar data presented one year ago shows very gratifying progress.

The number of engineering experiment stations reported was 19 in 1921, and is now increased to 22 by additions in Minnesota, Vermont, and Virginia.

In addition, Louisiana reports that "no doubt" the University of Louisiana will organize a station in 1924, when by provision already made the income of the university will be more than doubled. The State Board of Education of Montana has approved the creation of an engineering experiment station at the State College of Montana, with a definite budget beginning July 1, 1923, and is submitting the plan to the legislature this winter. The President of North Carolina State College of Agriculture and Engineering states that an effort will be made at the session of the legislature this winter to secure the establishment of a station, and that he believes that the effort will be successful. Michigan will ask the legislature for general research funds and if successful will establish an engineering experiment station.

Florida, New Jersey, and Oklahoma have added to their reports expressions in favor of the early establishment of engineering experiment stations at their respective institutions.

Although the business depression has made the securing of adequate research funds impossible as yet in some stations, it is interesting to note that Pennsylvania for the first time has placed an item (of \$30,000) in the legislative budget which she is presenting this winter. Furthermore the total engineering research funds reported by the land-grant colleges have increased from \$318,760 in 1921 to \$475,565 in 1922. This does not include the incomes of the State Bureau of Mines of Arizona and of that of Idaho, amounting to \$70,500 more, a considerable part of which is devoted to

<sup>20</sup> New Mexico College of Agriculture and Mechanic Arts has reported some interesting engineering research projects under way, including one upon "Adobe Bricks for Construction Work."

<sup>21</sup> The \$7,200 noted in the table as allotted for engineering research at Cornell University is part of the income from a research endowment given by Mr. August Hecksher, of New York City. A number of the members of the engineering faculty engage in some research. In lieu of bulletins they publish in current journals, especially in the *Cornell Civil Engineer* and in the *Sibley Journal of Engineering*.

<sup>22</sup> The North Carolina State College of Agriculture and Engineering reports that an effort will be made at the next session of the State legislature (January, 1923) to get authority and funds for an engineering experiment station. The college authorities believe the effort will be successful.

<sup>23</sup> North Dakota Agricultural College has reported on several definite engineering research projects which are under way.

<sup>24</sup> Oklahoma Agricultural and Mechanical College reports that it is trying to get some work started along the lines of engineering research but will not be able to report progress until after the meeting of the legislature in January, 1923.

<sup>25</sup> Oregon Agricultural College reports as follows: "I very much regret that our college has been unable so far to establish a research department or an experiment station. Financial conditions are such this year that we can make no plans for future research work."

<sup>26</sup> Pennsylvania State College is this year for the first time putting in her legislative budget an item (\$30,000) to carry on the work of the engineering experiment station.

<sup>27</sup> Rhode Island State College has made reports on some definite engineering research projects which are under way.

<sup>28</sup> Clemson Agricultural College (South Carolina) reports hopes of beginning some research work soon, probably with road materials.

<sup>29</sup> The Utah Agricultural College reports (Dean of Agricultural Engineering), "Station organized, but have given us no funds as yet."

<sup>30</sup> The College of Engineering of the University of Wisconsin supports holders contribute materially to the engineering research work of the station.

engineering research. Probably a total of over \$500,000 is spent annually for engineering research at land-grant colleges.

The number of full time men on research staffs has increased from 53 in 1921 to 84 in 1922, and the number of part time men from 324 to 352, of whom 66 are paid for the time devoted to research.

One of the most encouraging features of engineering research at the land-grant colleges in 1922 was its comprehensive character. No one can peruse carefully the pages of the four issues of Engineering Experiment Station Record for 1922 without considerable amazement at the excellent accomplishment. The reports are not vague and general but are restricted entirely to definite research projects, whose number is surprisingly large. The subjects of the researches demonstrate conclusively the essential correctness of the fundamental principle of the land-grant college experiment station idea, which is that the engineering research needs of the public and of the industries of the several States are such as to require separate State engineering experiment stations, rather than a few serving bigger areas, and that the States need engineering experiment stations as badly as agricultural. A State in the southwest, for example, reports a project on the materials, manufacture, properties and uses of adobe brick, while another in the central United States reports several ceramic researches involving the very highest kiln temperatures attainable. Missouri is investigating the production of radium from her carnotite ores. Others are interested in helium production. Irrigation subjects are favorites in the arid regions, and manufacturing researches in the East and in the Midwest. All over the United States the land-grant colleges are studying and testing the local road materials. North Dakota is investigating the effect of low temperatures on the breakage of car axles. The chemical engineers of Iowa are demonstrating the possibility of manufacturing furfural and a half dozen other valuable products from the thousands of tons of corn cobs now largely wasted.

Along with such researches of special local interest are mingled many on fundamental engineering science which will be of great importance to the whole engineering profession. Illinois, for example, is studying the warping of paving slabs, the temperature variations of the clear width of rock gorges; and methods of photographing sounds on moving picture films and reproducing them coincident with the visual pictures. Iowa has discovered the true theoretic law of loads on culverts, both from embankment materials and from wheel loads. Kansas is investigating wind resistance to moving vehicles. Massachusetts is doing intensely interesting work investigating many complicated and obscure cases of stress distribution, using a modern development of the polarized light method. Massachusetts and Iowa are cooperating with other agencies in determining the tractive resistance of loads on highways, and the true theory of economic highway grades. Eight land-grant colleges are assisting in the cooperative study of heat transmission through different insulating materials and the infiltration of outside air through the walls of closed rooms.

Your committee believe that the regular requests made every three months by the secretary of the engineering section to every land-grant college for definite information about engineering research work in progress, and the prompt publication in Engineering Experiment Station Record

of the data furnished, have done much to stimulate and promote such work. Quite a number of the smaller colleges, though as yet without stations, are reporting work of much interest and possible value. It is believed that the development now well under way of engineering research in the smaller land-grant colleges will soon refute conclusively the argument against the land-grant college engineering experiment station bill that in several States there was no interest in such research at the land-grant colleges or need therefor.

Your committee believe that all but a very few of the land-grant colleges would like to organize engineering experiment stations promptly, and that they will proceed to do so as fast as they reasonably can. Possibly there are one or two exceptions in the case of large universities, which do not seem to take a part in organized engineering research at all commensurate with their size, and also in the case of one or two small institutions which as yet pay little attention to any phase of engineering. We believe that even these very few institutions which we count as exceptions inevitably will be drawn into the engineering experiment station movement as it progresses with the backing of the Association of Land-Grant Colleges.

Following out the plan agreed upon one year ago your Engineering Experiment Station Committee is now engaged in active preparation for publishing a printed volume of the Engineering Experiment Station Record. After careful consideration of definite recommendations prepared by our secretary, as the result of his year of experience and his study of the situation, we have decided to recommend a paper bound, printed volume, of regular engineering experiment station bulletin size, with the following contents and arrangement:

#### SUGGESTIONS FOR ENGINEERING EXPERIMENT STATION RECORD

##### Index and Summary, 1921 and 1922

##### Section of Engineering, Association of Land-Grant Colleges

#### CONTENTS

- I. Title page, title, Engineering Experiment Station Record, index and summary, 1921, 1922.
- II. Officers and committees.
- III. Table of contents.
- IV. Foreword by Dean Marston, chairman of the Committee on Engineering Experiment Stations.
- V. Institutions arranged alphabetically by States.
  - (1) Organization, covering data called for on "General Information" blanks with perhaps some additions as to college publications.
  - (2) Bulletins published.
  - (3) Research projects completed or discontinued but not published.
  - (4) Research projects in progress.
- VI. General summary.
- VII. Classified index.

To finance the undertaking we now have available approximately \$250 unexpended balance from the two \$250 annual allotments already made us by the Executive Committee of the association and we propose to ask them to increase the annual allotment to \$350 for 1923.

At the end of 1921, your secretary with the assistance of the rest of the committee carefully revised the standard forms sent quarterly to the several land-grant colleges for reports on research work. In general, the results during the year have been very satisfactory. However, we invite suggestions for further improvements in these forms, and we earnestly request their exclusive use by the several institutions in reporting. We urge especially that each institution give each of its research projects a distinctive number, which shall not be changed or duplicated. We further urge that each page of data be signed before forwarding to our secretary.

Your committee wishes to call the attention of all the land-grant colleges to the great desirability and the many advantages of establishing graduate research fellowships in engineering. Several institutions already have found such fellowships to be of great value in promoting engineering research at small expense. In addition, they also help to promote engineering graduate work, and this now is one of the urgently needed developments of engineering education. The usual stipend of such fellowships is about \$600 per year. The fellows should give about half time to the service of the engineering experiment station and should not be called upon to do any teaching whatsoever. They should be able to complete the work required for the master's degree in one academic year of 9 months plus one summer session of 3 months, or the fellowships may be extended over two years.

Your committee called attention one year ago in its first annual report to the great national program of highway research which has been organized under an Advisory Board on Highway Research, sponsored by the National Research Council and backed by the United States Bureau of Public Roads. Such wonderful discoveries in highway research have been published during the last year as to make possible for the first time the rational design of pavements to carry given traffic safely. The true theory of loads on culverts appears to have been discovered. The theory of economic grades is assuming shape rapidly.

The land-grant colleges of many States are cooperating actively in this research, in many cases by entering into cooperative research contracts with the United States Bureau of Public Roads. In numerous other cases the land-grant colleges are cooperating directly with the State highway commissions, especially in the study and test of road materials.

Highway research is especially appropriate for land-grant colleges, with their missions of fostering both engineering and agriculture.

Your committee, therefore, recommends that the engineering section report to the general session a request that the standing committee on engineering experiment stations be authorized to take the necessary steps to secure membership of the engineering section in the Advisory Board on Highway Research of the National Research Council. Such membership does not entail any financial obligation.

Director Stratton of the United States Bureau of Standards recently entered into correspondence with your committee concerning a possible conference between the bureau and the engineering experiment stations throughout the United States. In consequence, the committee met Director Stratton and a few members of his staff at the bureau, Monday, November 20, 1922. The discussion brought out the fact that land-grant college engineering experiment stations already are cooperating actively with the



United States Bureau of Public Roads, and to some extent with other government departments (including the Ordnance Department and the Quartermaster General's Department), and that cooperation with the Bureau of Standards might best be in connection with definite cooperative researches in which both the bureau and individuals or groups of the land-grant colleges might be interested. Director Stratton delivered to us a definite, formal invitation for a conference in Washington, probably next March or June, between representatives of the land-grant college engineering experiment stations and the Bureau of Standards, on the specific question of engineering standards and standardization. Your committee recommend that the engineering section report to the general session a request that the engineering experiment station committee be given authority to arrange such a conference.

Your committee has also discussed at considerable length the question of Federal legislation in support of engineering experiment stations at land-grant colleges. We recommend that the engineering section report to the general session a recommendation that the Association of Land-Grant Colleges transmit officially to each of its member institutions a reaffirmation of the recommendation adopted by the executive body last year " \* \* that as rapidly as conditions permit, engineering experiment stations be established in connection with each land-grant college giving instruction in engineering," and further that the Executive Committee of the general association from time to time take such steps as in its judgment may be necessary and wise to promote the passage of Federal legislation granting Federal aid to an engineering experiment station at each land-grant college.

#### SUMMARY OF RECOMMENDATIONS

In conclusion, your committee summarizes its recommendations requiring official action of the engineering section, as follows:

That the engineering section, in accordance with the procedure prescribed in the constitution, communicate to the general session the following recommendations:

(1) That the executive body authorize the Engineering Experiment Station Committee to proceed to publish Engineering Experiment Station Record, Index and Summary, 1921 and 1922, substantially as outlined in the second annual report of the committee, and that such publication be financed as follows:

(a) From the unexpended balances (totaling approximately \$350) of the two allotments of \$250 each made to the Engineering Experiment Station Committee by the Executive Committee for the respective years of 1921 and 1922;

(b) From the available balance of an allotment of \$350 which the Executive Committee is requested to make to the Experiment Station Committee for 1923.

(2) That the Engineering Experiment Station Committee be authorized to take the necessary steps to secure membership of the engineering section in the Advisory Board on Highway Research of the National Research Council, and further to designate a representative and alternate to serve on that board, all without incurring any financial obligation.

<sup>1</sup> Proc. 35th Ann. Conv., Assoc. Land-Grant Colleges, 1921, p. 343.

(3) That the Engineering Experiment Station Committee be authorized to arrange a conference at Washington between representatives of the land-grant college experiment stations and the United States Bureau of Standards on questions of engineering standards and standardization.

(4) That the Association of Land-Grant Colleges transmit officially to each of its members a strong reaffirmation of its recommendation adopted in November, 1921, " \* \* \* that as rapidly as conditions permit, engineering experiment stations be established in connection with each land-grant college giving instruction in engineering."

(5) That the Executive Committee from time to time take such steps as in its judgment may be necessary and wise to promote the passage of Federal legislation granting Federal aid to an engineering experiment station at each land-grant college.

Respectfully submitted,

ANSON MARSTON,  
A. A. POTTER,  
G. W. BISSELL,  
C. R. JONES,

*Committee.*

On motion, the report was adopted and the secretary was directed to present the recommendations of the committee to the Executive Committee of the Association. For action of the Executive Body see p. 368.

The report of the secretary was read and approved, as follows:

#### REPORT OF SECRETARY-TREASURER OF THE SECTION

At the New Orleans meeting in 1921, the name of the experiment station bulletin was changed from "Quarterly Reports" to "The Engineering Experiment Station Record."

It was also decided in committee meeting to standardize the blank forms for reports; to increase the issue to 200 copies; and to mail three copies of each number to each of the land-grant colleges; one to the president and two to the dean of engineering.

After a careful study of the splendid reports, questionnaires, and blanks prepared by the retiring secretary, Dean Sackett, and similar blanks used by Dean Marston in securing data for his special reports, three blanks were prepared, the first for general information, the second for reporting new station projects and the third for progress reports on projects previously listed. The provisional blanks were submitted to the experiment station committee and later revised in accordance with the suggestions of the different members. These blanks have served the purpose for which they were intended exceptionally well.

In a few instances institutions have not been careful to separate reports on new projects from progress reports. In such instances all previous bulletins have to be checked over in order to properly place the report. The deans and directors can lighten the burden of the editor materially by properly designating the reports and by taking care not to include new project and progress reports on the same sheet. It would also be helpful to the editor if all the institutions assigned definite numbers to the different projects reported.

The four numbers of the Record issued during the year comprise a total of 85 pages, the separate numbers being made up of 18, 25, 13 and 29 pages respectively. The cost or rather, I should say, the amount of the charges (a much smaller figure than the cost) including preparation of blanks, postage, etc., amounted to \$178.39. The average cost per issue was \$44.60; for a single copy \$0.22, and for one page approximately \$2.00. There are about 50 copies of each issue that have not been distributed. No account has been kept of the general correspondence and no charges have been made for program expenses except for stamps and stencils amounting to \$3.40. This has been paid from the special fund of \$16.76 belonging to the engineering section. The balance of this fund is now \$13.36.

Respectfully submitted,

C. R. JONES,

*Secretary-Treasurer.*

A detailed statement of expenditures was appended to the report.

The following paper was presented by O. M. Leland, Dean College of Engineering and Architecture and the School of Chemistry, University of Minnesota.

#### THE ORGANIZATION OF AN ENGINEERING EXPERIMENT STATION

BY O. M. LELAND

When it was suggested that I prepare a brief paper on the organization of an engineering experiment station, my first thought was that, being concerned with one of the youngest stations in the country, I should have less to contribute, probably, than would many other deans. However, with the idea that the principal function of the paper would be to arouse a discussion which would bring to light some useful suggestions for those institutions which contemplate the establishment of stations, I decided to present to the Section of Engineering some facts and opinions which were considered in connection with the organization of our engineering experiment station at the University of Minnesota. It is a pleasure to acknowledge the kind assistance and advice received from the directors of several of the principal stations, both with regard to our new station and recently in gathering new information for use in this paper.

*Objects.*—In general, we may say that the purpose of the experiment station is to increase and disseminate knowledge, primarily in those fields which are concerned in the industries and in the development of the resources of the State or Nation. It is particularly devoted to practical, objective, or applied research as contrasted with general (sometimes called "aimless") investigations.

In connection with an educational institution, the experiment station serves to correlate the research carried on in the various departments, to stimulate new research projects, to inspire students with the spirit of investigation, and to provide a central bureau of technological research for the region in which it is situated. An indispensable function, of course, is the publication, usually in the form of bulletins, of the results of its investigations so that they may be available to all interested persons.

*Act of establishment.*—The two common processes by which the station is formed are, (a) by action of the board of regents, as a new department in the college, making use of existing funds for its maintenance; and (b) by act of the State legislature, carrying a special appropriation for the support. A third plan is, (c) by joint action of the Federal government and the university or the legislature, with joint provision for the necessary funds; essentially, however, this amounts to one of the above methods but with a cooperative agreement with the Federal government. In either case, also, this arrangement may be added subsequent to the original establishment of the station.

*Financial support.*—The funds for the maintenance of the station activities are obtained from various sources at different institutions. Generally, the largest amounts are derived directly from legislative appropriations. The principal forms of support are: (a) University funds; (b) special appropriation by legislature; (c) Federal funds; (d) private gifts or endowments; (e) funds for special projects, provided by individuals, corporations, industries or associations, or the legislature; and (f) profits or fees resulting from commercial investigations, patents, etc.

*Administration.*—The size of the station, indicated by the amount of its budget, determines to a great extent the form of its administrative organization. Its activities may be grouped under the heads of (a) administration, (b) research, and (c) publication.

Almost invariably, the dean of the college of engineering is the director of the engineering experiment station, and at the outset, when the funds are not large and the projects are few, he may constitute the entire executive staff, assisted only by his department heads called into consultation.

Progressing farther with increased growth, the advisory group becomes the executive committee, chosen from the heads of departments or chiefs of research divisions. Then as projects are completed, the publication committee is soon needed, and an editorial staff. An assistant director for the station will be needed as its work becomes more extensive and especially since the director serves also as dean of the college. Finally, a special clerical staff is required with its own records and facilities.

*Research staff.*—In the beginning of the station's history, all of its research will generally be carried on by members of the teaching staff of the college, in person, and to some extent this will continue to be the case. However, as additional funds become available and facilities are increased, part-time and full-time workers are added and a research staff is developed.

Herein lies the strength or weakness of the station. The idea seems prevalent that almost any teacher can do satisfactory research work. This is far from the fact. There are good teachers and good investigators and some men are in both classes, but not a large percentage, in my opinion. Those who can do both at the same time should be encouraged to do so, by all means, both for their own growth and that of their students, who will profit greatly from this source of inspiration. Such teachers should be given lighter instructional duties while carrying on active research work, and also such assistants as they can profitably utilize.

The ideal research staff seems to consist of a combination of teachers and part-time and full-time investigators and helpers, rather than all of

one kind. The close relation between successful instruction and research must be kept in mind. Teachers may well be assigned to the experiment station for a term or a year at a time so as to devote their entire time to research and then return to teaching.

It seems to be most satisfactory to administer the research workers through the instructional departments and divisions within which their work clearly falls. Others may be assigned to closely related departments or to a general or miscellaneous group.

*Experiment station staff.*—The entire staff of the station, therefore, may be grouped as follows:

Director (usually the dean of the college),

Assistant director,

Clerical and accounting staff,

Editorial and publication staff,

Executive or advisory committee,

Publication committee,

Departmental and general research staffs, composed of teachers, part-time and full-time investigators, and assistants.

#### DISCUSSION ON DEAN LELAND'S PAPER

L. D. CRAIN, Head Department of Mechanical Engineering, State Agricultural College of Colorado. It requires a considerable sum of money to organize and conduct an engineering experiment station. Perhaps some of the smaller institutions have delayed organizing such stations because of this fact. The plan of organization outlined in the paper by Dean Leland is comprehensive and well suited for those institutions which are fortunate enough to have the funds necessary. However, some find themselves in the position that expansion of activities is not warranted from a financial standpoint. In such instances, in land-grant colleges, it may be feasible to start the engineering station as a section or division of the agricultural experiment station, with a member of the engineering staff in direct charge of the division. Under this plan the director has the last word in matters of expenditure of the funds. He may, also, approve or reject projects. After the project is once determined then the chairman of the division, or the vice-director, or whatever the officer may be called, would have the direction of the work.

This plan has both merit and objections. It saves the duplication of expense for administration. Clerical work, editorial work on bulletins, and general administration is carried on by the main station without increase of cost in proportion to the cost of a completely separate organization. One other rather important advantage is the close association of engineering research with agricultural research. I am cognizant of the fact that many engineers care to have little of nothing to do with agricultural problems, preferring to serve the industries only. Those of us who are working in the land-grant institutions are neglecting a great opportunity to advance engineering, and research in engineering, if we fail to recognize that there are engineering problems connected with agriculture. I am not advocating the use of our engineering experiment stations for research in problems pertaining to agriculture exclusively, because I feel that the industries have a right to expect service from these stations, but there are

legitimate problems the engineering station should try to solve for the farmer.

Some of the disadvantages of an organization such as I have mentioned are rather self-evident. The success of such a station depends very largely on the director, who usually is a man from the agricultural faculty. If he be antagonistic, or even lukewarm towards engineering research, somehow the larger portion of available funds finds its way into other sections, and engineering research is retarded. The director can hardly be expected to understand the engineering problems any more than the engineer fully comprehends the purely agricultural problems; hence conflicting interests. The worker in engineering stations may not develop the keen interest he would if the organization was entirely engineering.

The object of the engineering experiment station is to serve by bringing to light principles and facts that hitherto have been hidden. I do not think we should look upon our station as a laboratory for our students, although for advanced students it may incidentally prove to be such. Their laboratory should be in their department of the college. After their training there, then they may with profit both to themselves and to the station, become workers in the station. It is possible, I will admit, to train the students in the station if the staff have the time, and the organization permits, to give the proper supervision. This, however, is the function of the instructional departments of the college.

R. A. SEATON, Dean Division of Engineering, Kansas State Agricultural College. Dean Leland's excellent paper has been of much interest to me, and, I am sure to all who heard it. He has covered the subject fully and concisely, treating briefly the various essential features. I shall not attempt to discuss all of the various items he has mentioned, but shall take up only a few matters which have come to my attention in connection with the work of the engineering experiment station at the Kansas State Agricultural College.

Probably the matter which gives greatest difficulty in most stations, and greatest concern to those who contemplate the establishment of stations, is that of securing funds for carrying on the work, and any comprehensive program of research does require the expenditure of considerable sums of money. Yet it is surprising how much may be accomplished with very limited funds. As Dean Leland has suggested, for a time after the station is established, most or all of the station work may be done by the regular teaching staff. To a certain extent it is possible for this to be handled in addition to the regular teaching and other college duties. Research work is sufficiently different from teaching duties that it will serve to some extent as a relaxation from the latter work, and some ambitious instructors may be able to do creditable pieces of work in addition to what is ordinarily considered a full teaching schedule. I see no reason why a college teacher should not devote from 48 to 54 hours per week to duties connected with college work, in recitations, student consultations, preparation for classwork, correction of papers, study and research. Many instructors fall short of this, and with proper encouragement and stimulation may give a considerable amount of time to research without interfer-

ing with their other duties. In fact, a certain amount of research may react very favorably on their teaching.

Station work so accomplished does not involve the expenditure of funds other than those necessary for maintenance of the experimental work, and there are many projects for which such expenditure need not be greater than can be handled from departmental maintenance funds. The engineering experiment station of the Kansas State Agricultural College operated for a number of years and published several bulletins before any specific funds were set aside, either for salaries or maintenance of research, with instructors carrying full teaching duties.

The amount of work which can be done under such conditions is, of course, very limited, and as soon as practicable, arrangements should be made to relieve certain men who are best adapted to carrying on desired research, from part or all of their teaching duties. In my judgment, it is desirable that a considerable degree of relief should be given to a few men, rather than a less degree to a larger number, as in the latter case the relief time is likely to be absorbed largely by routine duties rather than research. Probably not less than one-fourth time and preferably one-half time relief should be given. The period of relief may be for one or more semesters until the research project is completed, or the instructor may be assigned to give a definite fraction of his time to the station for an indefinite period. When funds are very limited and it is difficult to secure approval of the budget of full-time research workers, it may be possible to secure approval of additional instructors who can give part time to research.

I agree fully with Dean Leland that it is desirable ultimately to have on the research staff, full-time workers, part-time workers, and regular instructors, but it may take a number of years before such an organization can be developed. In my judgment it would be very unwise to defer organization of a station until such ideal conditions can be secured.

A matter on which I realize there is considerable difference of opinion is the doing of routine testing by the engineering experiment station. At our station, we have for several years been making all tests of road materials for the State Highway Commission in connection with Federal Aid Highways. Although the greater part of this work is routine in character, a considerable amount of research is necessary. The work is self-supporting and our experience with it has been very satisfactory. It has served to stimulate the work of the station, and the results accomplished have helped to impress upon those to whom we must look for funds, the importance of the station work. Such routine testing work may serve as an entering wedge which will make possible the organization of stations at colleges where they have not yet been established, and may serve to strengthen stations already organized.

In conclusion, I believe that when the necessary approval can be obtained, the engineering experiment station should be established at once without waiting for special appropriation of funds. Little difficulty need be anticipated in organizing the station and initiating research, using the teaching staff and departmental maintenance funds until other workers and funds become available. I also believe that routine testing work for the State, properly handled, will assist in strengthening the station and in securing funds for its maintenance.

C. N. LITTLE, Dean College of Engineering, University of Idaho.<sup>1</sup> I shall confine my discussion of Dean Leland's paper to one point, which seems to me a very important one, viz.: What central control or supervision shall be provided for engineering experiment stations? Without some supervision there will be much duplication and unnecessary repetition of work. Many of the problems which will be considered are independent of local conditions and might just as well be attacked at one place as another and just as satisfactorily solved by thorough investigation at one station as at a dozen.

Of the six forms of financial support of an engineering experiment station, to which Dean Leland has called attention, the first three draw their respective funds from public taxation. This is strictly true of the second, "Special appropriation by legislature," and the third, "Federal funds," and with the exception of income from endowments it is also true of the first, "University funds."

In these days when the burdens of public taxation are beginning to chafe and form sore spots, it is essential that a new institution asking support from taxation shall be free from any just charge of useless expenditure. Useless duplication of scientific work can no more be defended than any other waste and is to be deprecated because there are so many directions in which money for engineering research can be advantageously employed.

That there are difficulties and dangers connected with central control no one is likely to forget. It is all the more important that the most careful consideration should be given to this question and advice be sought from agencies likely to give help. The National Research Council would doubtless be deeply interested and in position to offer useful counsel.

J. S. A. JOHNSON, Director Engineering Experiment Station, Virginia Polytechnic Institute. The principal object of the paper by Dean Leland and the discussion of this question is to render assistance to institutions that have not begun organized engineering research as well as to those just starting. Reference will accordingly be made to several possibilities which may be of benefit to other beginners.

Assistance from the Federal government seems a long way off, and it is usually only after an engineering experiment station has been organized and is producing results that a special appropriation for its support can be secured from the State legislature. When beginning, therefore, it will generally be necessary for the existing engineering teaching staff to assume responsibility and take the initiative.

Although, of course, some individuals are equipped temperamentally and by training as teachers primarily, while others are especially qualified as investigators, every teacher of science and engineering should possess the spirit of research toward all his work, and never be content to present a subject only in accordance with the text. New viewpoints, new relationships, new applications, should be sought constantly by all teachers with a view of adding something to the common stock of knowledge, and if such efforts could be properly directed and coordinated it is probable that research work might be conducted in connection with instruction with little, if any, addition to the conventional teaching load. Indeed, it might

<sup>1</sup> Submitted in writing. Dean Little was not in attendance at the convention.



be possible to revise the content of courses and redistribute the work of teaching staffs at all engineering schools, including those having well organized experiment stations, in such a way as to allow practically all teachers and some advanced students to contribute a portion of their time toward research. The results should be beneficial to both teachers and students.

The matter of prime importance is to have a definite objective, and the engineering faculty as a body should address itself more seriously to the task of determining what kinds of investigations would be of most benefit to the State and Nation. The methods of procedure would then rest to a large extent with the heads of departments individually, and different phases of the research work might be assigned to selected groups of students in place of customary experiments. When, for example, experience with the indicator and a knowledge of applied thermodynamics have been acquired in the test of a steam engine, similar experiments on air compressors, refrigerating machinery and internal combustion engines might subsequently constitute a part of an original investigation. In this connection it should be urged that practically all laboratory equipment should be secured with a view to using it in research as well as for instruction.

To begin the work of an engineering experiment station, therefore, a certain amount of tradition must be discarded, inertia is to be overcome, and a readjustment of the attitude of some teachers toward teaching as well as toward research must be effected. Even at those colleges where experiment stations are functioning, and which receive liberal special appropriations, considerable use is made of equipment and staff which would normally be required for teaching only, and it follows that beginners in the work must concentrate on this method of procedure.

At the Virginia Polytechnic Institute we hope to apply some of these ideas. Our engineering experiment station was established by act of the Board of Visitors only last year, and, consequently, not very much can be said from experience. The plan of development for the institute contemplates an organization of the engineering school similar to that in existence for the school of agriculture in which the offices of director of the experiment station and director of the extension division are distinct from the office of dean. The administrative council of the engineering station includes as members the professors of chemical, civil, electrical, experimental (mechanical), mining and metallurgical engineering, mechanic arts and physics. All other engineering and related departments are expected to cooperate. As yet there is no special appropriation by the legislature for its maintenance, and we are accordingly endeavoring to get started by following some of the suggestions made in this paper. We realize that it is a case of working out our own salvation, and of receiving the best of help by helping ourselves.

WEDNESDAY MORNING, NOVEMBER 22, 1922

The report of the Committee on Uniform Patent Practice was submitted by its chairman, A. A. Potter, Dean Schools of Engineering, Purdue University, as follows:

**REPORT OF THE COMMITTEE ON UNIFORM PATENT PRACTICE IN LAND-GRANT  
ENGINEERING EXPERIMENT STATIONS**

Your committee appointed to investigate the practice of land-grant colleges with reference to patents resulting from investigations of engineering experiment stations begs to report as follows:

(1) Communications from the directors of the engineering experiment stations indicate that only three institutions have formulated any definite policy with reference to this matter.

The policy of the University of Illinois is most definite and is fully explained in Circular No. 9, page 18, of the University of Illinois Engineering Experiment Station. The University of Illinois takes the stand that in view of the fact that it is a State institution supported by public funds, it is its duty to reserve for the use of the public all benefits accruing from investigations made by the university or under its control. Thus the University of Illinois reserves the right to all discoveries and inventions made by any member of the teaching staff or scientific staff as the direct result of his regular duties or at the expense of the University of Illinois. The expenses connected with the patent application are borne by the university. The board of trustees of the University of Illinois administers the rights under the patents in ways to suit the conditions, dedicating the patent to the public or licensing its use. Any sum above a nominal royalty is paid by the university to the patentee. Copyrights on books or inventions made by members of the teaching or scientific staffs outside of their regular duties or at their own expense are not the property of the university.

The policy of Purdue University is similar to that of the University of Illinois. The patents are taken out under the name of the inventor and are transferred to the Purdue Engineering Experiment Station for a consideration of the minimum legal fee of one dollar. Up to date two patents are the property of the Purdue Engineering Experiment Station, a new process for the manufacture of ozone (Patent Ser. No. 503,123) and a new type of an automobile carburetor (Patent Ser. No. 531,068).

The Washington State College has a policy similar to those of Illinois and Purdue Universities. This institution has one application for a patent now pending.

(2) The following suggestions with reference to patent policy were received from the directors of engineering experiment stations:

(a) That an institution has a right to inventions or discoveries made by the members of its staff incident to their regular duties or at the expense of the institution.

(b) There may be cases where the inventive genius of the investigator, while helped, no doubt, by his surroundings in the experimental laboratory, nevertheless would have evolved the same idea under circumstances where there would be no question as to it being his property. There would be other cases where, without question, the investigator could not have any moral claim personally to the ownership of the patent. Therefore, it would

be rather difficult to make any hard and fast rule but what would work some injustice one way or the other. In any case the inventor should have some equity in the patent, but so should also the institution. The method used at the University of Illinois seems to be fair to all concerned.

(c) That the main reason for securing patents on inventions is to prevent an outsider from pirating them at the expense of the public.

(d) The possession of a patent implies an obligation to utilize the invention for the benefit of the public. If there is danger that the patent will be filed away "under a bushel" it will be better for the institution to forego its right to inventions.

(e) Several were of the opinion that the inventions or discoveries made by members of engineering experiment station staffs should be made available to the public without restriction. Mr. Alfred D. Flinn, Secretary of the Engineering Foundation brings out the fact that: "*A patent given to the public is often most effectively withheld from the public, because no one would assume the business risk and the development expense necessary to commercialize an article over which he can have no control for a reasonable period.*" Only patents which have no commercial value may be properly dedicated to the public.

(f) The question of disposition of the patents is a most difficult problem to solve. If manufacturing rights are granted to all who apply, responsible business concerns would not be interested. Educational and research institutions are not in a position to do commercial business, such as would be involved in owning patents, to defend the patent owned, or even to negotiate successfully for the disposal of rights under patents. Unbusinesslike methods in handling patents by educational institutions would hinder rather than promote discoveries or inventions. It will be necessary to have some outside organization handle the details with reference to the disposition of the patents. The Research Corporation of New York was organized to handle patents of those who are not in a position to exploit them. In time the various engineering experiment stations may accumulate a sufficient number of patents as to justify the organization of a central clearing house for the administration of such patents.

(3) With the above suggestions in view your committee recommends as follows:

(a) That recognition be given to the right of educational and research institutions to inventions and discoveries made by members of their staffs on institutional time or at the expense of the institution.

(b) That while uniform rules are difficult to attempt, the policy of the University of Illinois, as explained in Circular No. 9, page 18, of the University of Illinois Engineering Experiment Station, be followed for the present by the engineering experiment stations of land-grant colleges in connection with discoveries and inventions of members of their staffs.

(c) That definite arrangements with reference to patents should be made with members of staffs who are likely to make patentable inventions.

(d) That the assistance of some agency be secured in connection with the administration of patents which are of commercial importance.

A. A. POTTER,  
C. R. RICHARDS,  
W. N. GLADSON,

Committee.

On motion, the report was received and adopted.

The following paper was presented by E. J. McCaustland, Dean School of Engineering, University of Missouri:

#### THE IDEAL FIVE-YEAR ENGINEERING COURSE

BY E. J. McCAUSTLAND

The subject matter included in and the time devoted to engineering curricula are moot questions attracting the attention of the engineering profession at the present time to an unusual degree. Naturally, these matters are of special interest to engineering teachers; and an indication of the earnest desire on the part of these teachers to seek more light in regard to those problems is shown by the action taken in appointing a "Development Committee" of the Society for the Promotion of Engineering Education at the Urbana meeting last summer. This committee has recently issued a preliminary report which in effect recommends further organized research in the whole field of engineering education. The committee emphasizes the principle that, "first of all the facts should be determined."

The principle will no doubt find ready acceptance, and the committee will be commended, but it is not easy to separate facts from personal opinions which are strongly or loosely held according to individual experience, temperament, and bent of mind but which are constantly obtruded with the net result of seriously beclouding the whole problem.

The committee has made an excellent beginning, however, and it points out that the problem will involve two fundamental inquiries: (1) "What the engineering graduate should be," and in seeking to answer this query the committee says, "It will be necessary to study the functions of the engineer of the past and of the present time, and to try to conceive those of the future, keeping in mind the high ideals of service to be rendered the public and the profession." (2) "What the training of the engineering student should be and the influence surrounding him." To determine this, the committee thinks "it will be necessary to define and express as clearly as may be, these high and comprehensive ideals of service that they may be readily comprehended by employers of engineering graduates and by faculties and students."

Now a statement of the first fundamental raises the further question, Is it possible to determine, with any degree of accuracy, "what the engineering graduate of the future should be?" Few questions are more likely to be answered on the basis of mere personal opinion born of and nursed by environmental influence and possibly prejudices. "Engineer," and "engineering" are such broad terms that an answer to the question must be more or less complex in form and general in character. The engineering graduate may be any one of a number of fairly distinctive and definite educational products; much will depend upon the accident of early environment, upon native qualifications, upon personal ambition, and upon many other elements which help to determine his final place in his chosen profession entirely independent of and sometimes in spite of his education and training. The term "engineering graduate" must, therefore, not be interpreted in this connection as representing an individual product of the

schools, but as including the general class made up of individuals who have some things in common but who have also widely varying interests, as well as a wide range in natural abilities and in intellectual attainment. To illustrate, a research engineer employed in the electrical industry, master of the sciences of physics and chemistry, seeks constantly to unlock the mysteries of the ultimate constitution of matter and the ultimate sources of energy. Such a man is of an utterly different type in interest, in ability and in intellectual outlook from the designing engineer of great bridges and buildings who dreams his structural dreams and finally fabricates them in steel and stone. Different also are both of these from the sanitary engineer who designs and builds for the purpose of conserving life and health and whose ultimate success in his professional achievements must depend largely upon his relations with and understanding of the social and political organizations through which he must do his work. Much, however, in the matter of training they must have in common. Whatever their intellectual endowment, it must be developed and directed so as to function clearly, logically and accurately. Whatever their training, it must be methodical, rigorous and continuously more demanding. In whatever field they finally function there must be no doubt in regard to the foundations of their learning. The engineering graduate must be a man of character and judgment, scientific in his outlook and accurate in his knowledge; he must also be in sympathy with and have a lively appreciation for the spirit of the world he lives in. In addition to these qualifications he must have the special knowledge necessary for the practice of his branch of the great field of engineering. These are some of the qualifications which all engineering graduates must have in common. By all means, then, the schools must set themselves to the task of intellectual training, keeping these ideals constantly before them. How nearly they may meet these ideals will be a measure of their successes.

To recognize these needs and to prepare to satisfy them in the schools calls for a determination in some detail of what must be "the training of the engineering student and the influence surrounding him," and at this point it is important that some fundamental misconceptions and malpractices in the field of engineering education be recognized and rejected. The aim should be to give rigorous mental discipline. The mind of the student is to be trained and his intellectual powers increased. Mere information is, in comparison, of minor importance. Is this the conscious aim of the schools, or has attention been concentrated on the inclusion of informational subjects of narrow application to the neglect of other courses of wider appeal? So far as mental discipline is actually accomplished in school work it is apparently accomplished without regard to the subject pursued. No one can prove that this discipline may not be had in any field of intellectual activity, nor has it been proven that any one field is preeminently best. Why, then, the constant flux in the subject matter and arrangement of engineering curricula?

A college course should insure a breadth of outlook and knowledge that is not possible to be attained by the non-collegian. To reach this result, however, a keen interest must be aroused in the student. To merely require that he take courses in languages, history, economics, sociology and other fields of learning will not result in broadening his mind if he is not a willing and earnest seeker of light and learning. To require

him to enter upon special courses in a number of subjects under narrow and self-centered specialists who have no more interest in him than he has in them may secure to him a smattering of information gleaned under each taskmaster, but he will have neither the ability nor the inclination to relate these bits of isolated knowledge and, therefore, he will never attain understanding.

It is pretty generally agreed that the fundamental need in the field of engineering education is more intensive application on the part of the student and a better quality and closer articulation of teaching effort. Something should be done in these regards before the demand for additional time is seriously considered. While a four year job is confessedly being poorly done it does not seem logical to extend the time required of all men to five or six years. However, there is not likely to be much improvement in the effectiveness of engineering teaching in the near future. There is a more insistent demand for quality and efficiency in automobiles and phonographs than for high standard in education. To pay for the best in education does not appeal to the popular mind which is quite content with second rate results, unless some outstanding accomplishment arrests its attention and a spirit of rivalry is aroused.

Nevertheless, the extension of engineering curricula to five years will afford some opportunity for the selection of the superior student for further training. One must have at least some degree of ambition and enthusiasm for learning to go on beyond the fourth year, although there are, unfortunately, many exceptions to this rule. Parental ambition and a full purse may take the place of the more laudable incentives. With a group of selected men, however, a more intensive program becomes possible and as the development of the individual proceeds, his talents and aptitudes will open the way for educational effort to become more effective. In addition, a fifth year will afford an opportunity to make possible some selection of the "laborers" of the profession, the "hewers of wood and the drawers of water." A large and apparently growing number of those who come up to the engineering schools are predestined to fall into this class; a useful and necessary class, indeed, but one whose opportunity and natural ability for service will not justify the use of a longer period than four years for college training. There is, and will be, a continuous demand in the industries and in the business world for men trained as routine designers, plant operators, field men and engineering salesmen. To insure the requisite training for such helpers does not call for a longer period but for a better use for the time already allowed and for better and more inspiring teaching.

In passing, attention may be called to the possibility of training men for the more minor positions in work allied to engineering by establishing definite courses of two years in duration. There is always a demand for the trained shopman, the skilled draftsman, the surveyor, and the plant operator. An experience of two years spent in the pursuit of a well planned course of study in an engineering school will surely make these men more fitted for their respective lines of work. Their limitations in capacity and the boundaries of their interests may be reached in two years' time, but they are enabled to go out from the schools with some preparation for their chosen lines of work and with the likelihood of becoming useful and contented citizens.

What shall be the scope and detailed arrangement of a five-year curriculum designed to place the graduate "on terms of comprehension and sympathy with scholars of every time and of every land," by making possible some acquaintance with the wider ranges of human thought without which one may scarcely lay serious claim to learning; to insure also thorough training in the fundamental sciences underlying the specialty of engineering; and to give an effective training in the narrow professional or technical field so that expertness to deal with the special conditions that must be met in engineering practice is attained. This is the problem. To quote Dr. Olin of Wesleyan University, "The State needs both amateurs and experts, and every man should be both amateur and expert—expert in the business by which he lives, amateur of the things by which the Republic lives."

It is a well recognized fact that there is a great waste of educational effort expended on the inferior or totally unfit material that comes in throngs to our schools of engineering. Inferior or unfit, however, only from the standpoint of qualifying as experts in the field of engineering, but fully capable of maintaining amateur standing in the "things by which the Republic lives." The student body entering the universities is a picked group of much higher intelligence than the average of youth. Each one should, therefore, be directed into some useful line of educational endeavor that will prepare him for a livelihood as well as for life. To secure this, the subject matter of the curriculum should be arranged so that a student may see the possibility of certain definite accomplishments at the end of each year. He should be first introduced to that common body of knowledge which has always served to hold men and women in intellectual sympathy and understanding, namely, language, history, and mathematics. Then should follow the training which develops the expert. If curricula are so laid out, the student may withdraw at the end of two years in the full assurance that he has received a training for better citizenship and also one which will enable him to enter upon a definite career with a reasonable prospect of success. With greater capacity and a livelier interest, he may go on to the end of the four-year period which may well mark the close of his educational career, unless his aim is directed to the field of the expert. Thus, the content and the arrangement of the subject matter in the curriculum become of permanent significance only in their relation to each other and their gradation from the general to the special.

#### PROPOSED FIVE-YEAR COURSE IN ENGINEERING

With a basis of an 18-week semester and a credit of 17 college hours per semester, the following arrangement presents a uniform curriculum for four years and separate departmental curricula for the fifth year.

Figures given are semester hours, which mean one clock hour of recitation or lecture, or three clock hours of laboratory, drawing or field work per week for one semester of 17 weeks.

<i>First Year</i>			<i>Second Year</i>		
	Semester			Semester	
	First	Second		First	Second
Problems in American citizenship with written themes.....	5	5	Surveying .....	3	3
Mathematics .....	5	5	English .....	3	3
Shop .....	2	2	Calculus .....	5	5
Drawing .....	2	2	Shop .....	2	2
Chemistry .....	3	3	Drawing .....	2	2
	17	17	Chemistry .....	2	2
				17	17
<i>Third Year</i>			<i>Fourth Year</i>		
	Semester			Semester	
	First	Second		First	Second
Physics .....	5	5	Mechanics .....	4	..
Economics .....	5	or 5	Accounting .....	3	or 3
Elective .....	5	or 5	Hydraulics .....	3	or 3
Geology .....	3	or 3	Electrical machinery..	3	3
Materials .....	3	or 3	Heat machinery .....	3	3
Engineering problems.	4	..	Machine design.....	4	..
Mechanics .....	..	4	Stresses in structures..	..	4
	17	17	Elective .....	..	4
				17	17
<i>Fifth Year</i>					
CIVIL ENGINEERING			ELECTRICAL ENGINEERING		
	Semester			Semester	
	First	Second		First	Second
Water power .....	3	0	Thermodynamics ....	5	0
Structures .....	4	5	Electrical machinery..	6	6
Railways .....	4	4	Generation and distribution .....	..	3
Concrete and masonry ..	..	5	Electrical design.....	3	..
Highways .....	3	..	Transmission and communication ...	..	5
Sanitary engineering..	..	3	Power plants .....	..	3
Business law .....	3	..	Business law .....	3	..
	17	17		17	17
MECHANICAL ENGINEERING					
	Semester				
	First	Second			
Thermodynamics ....	5	0			
Thermodynamic laboratory .....	..	3			
Power plants.....	3	4			
Heating and ventilation .....	..	5			
Gas engineering.....	3	..			
Machine design.....	..	5			
Laboratory .....	3	..			
Business law.....	3	..			
	17	17			

The first two years of this curriculum offers to the student a fairly general introduction to the field of learning. He is given an insight into problems of American citizenship through the medium of lectures three times a week for one year. Themes are written on subject matter suggested by the lectures, the supervision of this work being in the hands of teachers in the department of English who meet the students for recitations three times weekly. In the second year the English training is continued. Courses in mathematics and chemistry parallel this work for the full two years. Shop and drawing also constitute part of the students' training during this period and instruction in surveying is a part of the second year's schedule.



During this two-year period, therefore, a student should develop some interest and taste in the things common to all men everywhere. He may then enter upon work allied to engineering as "the business by which he lives," with a fair probability of success in positions that confessedly do not require a high degree of expertness. If he continues in school work and completes satisfactorily the four years as laid out he will have acquired mental discipline through his study and specific knowledge in those sciences which form the basis of engineering; he will also have a share in that more fundamental training and knowledge which enables educated men to claim a common bond of interest, namely in the fields of language, economics, and sociology and, in addition, he will have a glimpse into the applications of the sciences to the art of engineering. But he is still below the standard of the expert. The successful completion of such a curriculum, however, is surely worthy of a bachelor's degree as representing four years' work of college grade; and since the major work included in the curriculum lies in the sciences underlying engineering and in their applications to engineering, it appears that the degree "Bachelor of Science in Engineering" is a suitable recognition for such work. The fifth year curricula as offered cover only the specialties of civil, electrical and mechanical engineering. Similar curricula might be arranged for other lines, such as chemical or agricultural engineering. The time is allotted, and subject chosen with a view to insuring an amount of special training to qualify the student as in some degree an expert. Business law is the only subject common to these curricula. The civil curriculum includes courses in structural and sanitary engineering, in water power, in railways, in roads and in concrete and masonry structures. The electricals have a five-hour course in thermodynamics and receive instruction in electrical machinery and electrical design, in generation and distribution, transmission and communication and in power plants. The mechanicals supplement a five-hour course in thermodynamics with thermodynamic laboratory; instruction is also given in heating and ventilation, in gas engineering, in power-plants, machine design and general laboratory work.

It is only too apparent that there is much omitted from these curricula that might profitably be included if time would allow. But with the period of college training limited to five years, educational effort should first be concentrated on those lines of thought and learning which are the common heritage of educated men; with increasing maturity of mind and development of intellectual strength the emphasis is shifted to the narrower channels of thought until finally in the last year of the course the student becomes entirely absorbed in the study of his own specialty. The arrangement of subject matter throughout is designed to give to the student a progressively expanding intellectual horizon, while at the same time insuring to him a limited scope of definite and accurate knowledge. It is for the teacher to inspire his soul and to inculcate that love for learning and intellectual power without which curricula of any length and content are of no avail.

## DISCUSSION OF DEAN MCCAUSTLAND'S PAPER

G. W. BISSELL, Dean of Engineering, Michigan Agricultural College. Through the courtesy of the author of the paper I have had in hand an abstract of it since October 27, and after careful reading I submit the following:

At a meeting of fourteen deans of engineering of Middle West engineering colleges in May last, called for the purpose of the discussion of five-year and six-year courses in engineering, the conference resolved that—

"In order to meet the constantly enlarging responsibilities of the engineering profession, we favor an advance in engineering education at this time that shall provide five years of collegiate training for those engineering students whose aim is to become qualified to take positions among the creative leaders in the profession, and that such advance shall be made in substantial accordance with the following plan:

"(1) Remodel the present four-year engineering curricula by substituting a substantial proportion of humanistic and fundamental subjects in place of an equivalent amount of advanced technical work. It is desirable that, so far as possible, the curricula in the different branches of engineering shall be sufficiently uniform to permit students to defer their final choice of a specialty at least to the end of the second year.

"(2) Add a fifth year of advanced work, mostly or wholly technical, and specialized to such an extent as desired.

"(3) The first four years of work shall lead to a bachelor's degree and the fifth year to an advanced degree in engineering."

You will notice that these resolutions recognize the possible desirability of some specialization after the sophomore year, whereas the author of the paper, here presented, recommends a uniform course for the four years leading to the bachelor degree.

I think that the conference idea is preferable because the uniform course lacks appeal to the average student who has the idea of specialization, particularly in the earlier years of his course.

I do not see how we can ignore this attitude of the student until practically all engineering schools unite on a course, uniform in principle, although not identical necessarily in subject matter.

I think that the credits now granted to military science in the land-grant schools should be included in the schedule of courses for the first two years.

Supplementing the above views and illustrating their application, I present the following:

## SUGGESTIVE OUTLINE OF FOUR-YEAR COURSE IN ENGINEERING

<i>Freshman</i>		<i>Sophomore</i>	
Chemistry .....	4	Drawing and surveying .....	3
Drawing and shop .....	4	English or economics .....	3
Mathematics .....	4	Physics .....	5
English or history .....	3	Mathematics .....	4
Military science and physical training .....	2	Military science and physical training .....	2
	17		17
<i>Junior</i>		<i>Senior</i>	
Mechanics .....	5	Hydraulics and heat engines...	5
Electrical engineering .....	3	Technical .....	9
Technical .....	6	Elective .....	3
Elective .....	3		
	17		17

<sup>1</sup> Recitation hours per week or equivalent.

<sup>2</sup> Specialization subjects.

<sup>3</sup> From general science, letters, history or economics.

The capable student should be encouraged to remain for a fifth year of mainly professional work.

S. B. EARLE, Director Engineering Department, Clemson College. In the beginning I should like to say that I thoroughly agree with most of the ideas so well expressed by Dean McCaustland in his valuable paper on this subject.

I particularly desire to express my endorsement of all the first part of his paper dealing with the question of engineering education in general. I have always believed that our courses in engineering should embrace the fundamentals of engineering thoroughly taught, and should not try to branch out and take in too special training. By fundamentals I not only mean the fundamental subjects but the fundamental principles of each subject. The student must be taught these so well that his thinking will be sound when solving engineering problems. In most cases the students do not really know what special phases of electrical or mechanical or civil engineering they will like best, or be best suited for. Some of the class will be interested in one phase, and others may be interested in an entirely different phase of the same branch of engineering. So it is not practical in our regular four-year courses to give much but the fundamentals in any branch of engineering.

There has for a long time been a question as to whether or not a five-year course in engineering should be given. There are some good arguments both for and against the five-year course, but I do not feel that it is necessary or desirable at this time to discuss these. The question is not whether we shall give a five-year course, but what is best for a five-year course, if such be given.

With conditions as they have been for the last few years, it would seem that it will be necessary almost to have a five-year course in engineering in order to do the same amount of work that was formerly done in four years. I hope, however, that these conditions may soon change so that either additional work may be done, or certainly a better grade of work. I do not favor a five-year course in such a case.

I am opposed to a five-year course in which is crowded a lot of additional engineering work, much or all of which may be very desirable for the engineer to know. I should much prefer the additional time to be given to subjects which tend to broaden the vision and culture of the student. The time has come when the engineer can not stay behind the scenes and do design work for the contractor to execute. He must be more and more interested in public affairs. He must be interested in and be able to assist in building up a better community, he must be a leader in the community in everything which tends for its betterment, he must in addition to his engineering knowledge be a man of culture, must be able to speak clearly and forcibly at public gatherings, and in every way be a real leader. I believe that one of the reasons, though not the only reason that doctors and lawyers have always been leaders in their communities is because, in the past at least, most of these men had finished their regular academic work before they took up their regular four-year course in medicine or law. Where time and money are available I believe that this course is also good for the engineer. This, however, is too seldom done, and I fear that even in the case of law and medicine this practice is not

followed to anything the extent it was in the past. I do not mean to say that by this preparation the engineer will take his proper place in the community, but without more of this kind of education I do not believe he will.

Too many men enter the technical school too early in life. They are not prepared to get out of a college course what they would if they were older. I know that some people consider that the student has not time to take up the cultural subjects—that he gets started in his engineering work too late. Personally, I do not believe that this is true. If we are looking for immediate results we better have a trade school. It is true that one who reads *The American Magazine*, or follows the advice of Edison, may be led to believe that the best way to success is by not going to college at all, but I believe that most people would disagree with this view.

Success in life is not wholly a matter of making money, and while it is true that some men may make more money by spending less time in college, I believe that the average man makes more of a real success, when everything is taken into account, if he takes up regular academic work, or certainly a good part of it, and after that, or along with it, takes his profession.

If a student is of the student type and finds himself desirous of pursuing further some phase of engineering work, he should go to some of the larger universities for this rather than take the so-called five-year course as given in some of our institutions. He will not only be afforded much better facilities, but will be brought into a different environment and be thrown with men from different colleges and different parts of the country. A year of this kind is very valuable to a man, entirely aside from the additional mental training and knowledge gained. I am not opposed to graduate work but think that in most cases it is better for the student to go to another institution for his graduate work rather than take it where he took his undergraduate work. I think that one of the disadvantages of any five-year course is that the student is too long at one place where he has gotten on to all of the ropes and does not develop as he should.

I notice that Dean McCaustland has made the courses for all of the three branches the same for the first four years, branching off only in the fifth year. While I think it is desirable to keep the courses as nearly alike as possible, where this can be done without either devoting too much time to the subject or where essentially different results are not expected from the study of the subject, I am inclined to think that there should be a little more variation between the civil and the mechanical and electrical. The mechanical and electrical I would make a little more nearly the same, even in the senior year. No standard course can be given. Curricula for practical reasons must depend on local conditions, size of student body, preparation of students, etc. It seems to me that a student should know by the fourth year whether he desires to take civil or mechanical or electrical. There are many reasons I think why the student taking civil engineering should be given a different course in electrical machinery than the course which is regularly designed for mechanical or electrical men. In most cases where the student takes only a part of a regular course, such as electrical engineering, with the electrical engineering men this part is not best suited to the man who desires to branch off to some

other line of engineering work. Some students think they know exactly what they want, and it is hard to keep them interested in any other phase of engineering work, though I do not agree that they should not be given this other work just the same. They often find that their liking for this particular phase is not as strong as for some other phase of engineering with which they come in contact after graduation. Then, too, circumstances often prevent a man from taking the exact work that he desires.

So much of the work of the mechanical and electrical man is so very closely related that I think the mechanical man should have a good deal of electrical work—much more than that given the civil engineering student.

The civil student should be given a little more civil work in the fourth year so that in the event of his not taking the fifth year, he will be better prepared to make a living and his interest will also be greatly increased if he has in this year some more purely civil subject.

In a five-year course considerable time should be devoted to the human side. It is no longer possible for the engineer to deal with materials and forces alone. Human psychology is of increasing importance. I believe that one of the reasons for the success of the graduates from our institution is not alone because of the engineering training they get, but because they live in dormitories very close together, have a lot of military work together, and unconsciously and inevitably learn a great deal of human psychology by this close four-year contact with each other.

I am not sure but that the teaching of English should go beyond the second year. Certainly if it is not regularly taught as an English course the laboratory reports should be read by one who can and will correct the English along with other errors.

One of the criticisms I would make of the curricula as outlined is the seeming lack of laboratory work in the upper classes. I assume that the credit hours include laboratory work in physics, chemistry, etc. I am not sure, however, about the electrical and civil engineering. I believe that considerable time should be devoted to materials testing laboratory with the civil men, and to electrical laboratory with the electrical men. I know of no more valuable course a student can have than laboratory properly taught.

I should also like to see physics begun earlier in the course if possible, and spread over a longer time. I consider physics one of the most important subjects in an engineering course, and believe that the student gets a great deal from his contact with the subject for a long time.

The time given to surveying is probably more than necessary for the electrical or mechanical engineering student.

I am glad to see the course in engineering problems but am wondering if this should be confined to one semester of one year. I believe that most engineering work should be taught from the standpoint of problems. Too many men are able to learn the pure theory, but have absolutely no idea as to its application to anything practical.

I am glad to see the course in economics but think we should insist on this being the proper kind of a course in economics and not the kind that has often been taught in our technical schools.

I should also like to have in the course, either as a subject or in connection with the teaching of other subjects, the proper use of the library. It can not be expected that an engineer shall learn and carry in his brain

the facts necessary to solve all engineering problems. It is necessary, therefore, that he learn at some time where to go to get the necessary facts or data for working out the problems with which he has to deal.

I agree with Dean McCaustland that in any five-year course some recognition should be given in the way of a degree at the end of four years.

In conclusion, I think that teachers often lay too much stress on the actual subjects taught or the exact number of hours given to each of the subjects. The average teacher who has been accustomed to have a certain number of hours per week for a certain number of semesters usually thinks that no satisfactory course can be given in less time. I have had some great discussions along this line when we have desired to revise our curricula, but in a number of cases where the hours were reduced and the courses rearranged, the teacher has told me that he believed he had accomplished just as much as before. We can not all have all the time we desire for each subject. After all, more depends on the teacher's enthusiasm and his ability to inspire the student to study and learn than the actual subject matter he teaches. We often hear that Mr. X is a good teacher because he can impart knowledge so well, but this in itself does not make a good teacher, and in some cases it is almost a handicap if he does too much work for the student. There is a tendency with a great many teachers to do this. We want the teacher not to do the work for the student but to be able to teach the student how to do the work for himself.

F. H. SIBLEY, Dean School of Engineering, University of Nevada. Following up the idea of saving time in arranging our courses of study, is it not likely that we can go somewhat further into the matter of eliminating obsolete and non-essential material and cutting out overlapping topics from similar courses?

In the smaller colleges, at least, we shall have some difficulty in introducing a five-year course for some time to come. In the meantime how are we to meet the demand for more time for nontechnical subjects?

Perhaps the suggestion made here yesterday by Dr. Mann that we apply the job analysis method to our courses might show us that we can gain some further time by condensation.

If it is true that all the essentials of physics required for an engineer's education can be covered by about thirty principles, it may be true that a good many of our engineering subjects can be given in fewer hours without loss to the student.

What has been said about leaving shop work out of the regular curriculum might also be applied to mechanical drawing. Our college courses have in general had too much of manual training in them.

C. R. JONES, Dean College of Engineering, West Virginia University. No one can read or hear the paper prepared by Dean McCaustland without appreciating the thought and care which he has given to the subject. It is a splendid piece of work and I am sure that most of those who believe that uniform five-year curricula in engineering are desirable will agree with him in a general way in practically everything that he advocates.

The majority of engineering students come to college with a fairly definite idea of what they want. There is a respectable minority who are undecided and change their major subject after the first or second years.

A large number of graduates, but a minority of the total, follow lines of engineering different from those in which they took their degrees. However, all classes want engineering subjects early in their college course and most students when they enter feel that they are wasting time on subjects which have no direct bearing on engineering. They are willing to take mathematics, English, chemistry and physics because they are fundamental to engineering, but other subjects if taken do not sink in very deep. Later, they realize the need of a broad training and are generally anxious to take up all the courses in such subjects as history, economics, business administration, and sociology that their schedules will allow. When taken in their third or fourth years in college, these subjects are of far greater value than when taken as fillers during the first or second year. Dean McCaustland evidently had this thought in mind when he framed the proposed four-year curriculum, but I would go farther in this respect than he has. I doubt the wisdom of a full three-hour or five-hour lecture course in American citizenship, running through the entire freshman year. The preparation of themes under the supervision of the English departments would be of decided value, but I believe that students coming from high schools need a different sort of training in rhetoric and composition than that offered by this type of theme writing. A three-hour course in industrial and political history with problems in citizenship would be very much better and should be taken later when it could be given more effectively. I would, therefore, postpone the course in American citizenship and substitute for it three hours of composition and rhetoric, one additional hour in chemistry, and one hour in military science.

Physics, in my opinion, should be given in the second year and mechanics in the third year. No other arrangement will give a student the proper sequence of studies and the preparation for the work of the fourth year. Electives and other subjects can easily be postponed to accommodate these changes.

As a whole, the subject matter for a uniform four-year course is well selected but the question of whether such a uniform course is advisable is still unanswered even granting for the time being that our engineering courses should be increased to five years.

Suppose a student wishes to study chemical engineering. The proposed four-year outline of study would not prepare him for his fifth year unless the fifth year were made elementary in character. The same thing is true for mining and for most of the other standard courses. It might be answered that this objection can easily be removed if the student takes elective courses that are preparatory to the fifth year of the curriculum that he has selected. But assuming that the electives are free, the students would enter the fifth year with varying degrees of preparation which would make a definite schedule impractical. If certain groups of electives should be required for specific fifth-year curriculum, the first four years of the course would cease to be uniform.

The broadest possible curricula consistent with the object sought should be adopted, but it should always be borne in mind that there is a practical limit beyond which it becomes a waste of time for a student to pursue a subject that he never intends to apply. No five-year course in which the first four are uniform can eliminate the waste of time involved. As examples in the proposed schedule, a total of eight hours of shop work and

six hours of surveying are required. This amount of surveying fits in very well for civil and mining engineers but it is certainly excessive for mechanical, electrical, and chemical engineers; on the other hand, eight hours of shop work for civil engineers is questionable.

Summer practice, whether for experience or to earn money necessary for expenses, is a very important factor to be considered. A uniform four-year course affords little help to the student in this direction.

Most engineering colleges already offer five-year curricula in one or more forms. A student may take a four-year course for which he receives a bachelor's degree in a specific branch of engineering with the opportunity of taking another year and gaining the master's degree in the same branch of engineering. Opportunity is usually afforded for a student to take a broader course, receiving the A. B. or B. S. degrees at the end of four years; and a bachelor's degree in a specific branch of engineering at the end of five to six years, depending upon the time necessary to complete the work not included in the requirements for his first degree.

Comparatively few students take a year of graduate work, though many have to spend five years to complete the work for the first degree. There are several apparent reasons for the small number who pursue graduate work in addition to those mentioned by Dean McCaustland. Students fitted to graduate work are encouraged by their professors to spend a year or two in practice before returning or going elsewhere for graduate work. Such students soon hold positions that they are unwilling to give up and few return. Many can not afford an extra year. In some lines apprenticeship courses are considered essential after graduation and the time element is the governing factor. The small percentage of those who graduate compared with the number beginning engineering courses clearly indicates that only the select can cover the courses in the allotted time.

The mortality among engineering students might be lowered by broadening the undergraduate curricula and by increasing the time allotted to mathematics, physics and chemistry. If the result would save students who would otherwise drop out and at the same time benefit the profession, engineering faculties could well afford to emphasize a fifth or graduate year, which would include much now given in the fourth year. My observation has been that students who are unable to carry an eighteen hour schedule do little, if any, better work when given a fourteen-hour schedule of the same character of work.

I can not speak with any degree of authority on the five or six-year combined science or liberal arts and engineering courses now offered which generally lead to two different bachelors degrees.

At my own institution a combined science and engineering course has been offered for a number of years. The student is supposed at the end of four years to have met all the specific requirements of the A. B. degree, to have covered all of the technical courses in the particular engineering course that he is taking that are accepted for credit toward an A. B. degree, and to get the B. S. degree. If he has chosen his electives carefully he can usually complete the work for his engineering degree in one additional year and one summer term. The only essential difference between such a course and those suggested by Dean McCaustland is a 20-hour foreign language requirement.



The number pursuing the course barely justifies its announcement. The small number taking the course is doubtless partly due to the language requirement and to the fact that less prominence is given to it than to the regular engineering courses. Quite a number when entering enroll for the course and later transfer to a regular course because of the extra expense involved. Others who find the regular course too difficult transfer to the combined course. Quite a number take the course as a preparation for law or business. Relatively few take the second or engineering degree.

On the whole I have been unable to observe any appreciable demand on the part of students or employers for the addition of a fifth year. The student already has the opportunity of spreading his course over five years if he wishes a wider range of work, and graduate courses afford the same opportunity for the specialist that they would if the regular curricula were extended to five years. I believe that more attention should be given to graduate work in engineering, but that is another problem.

E. A. HITCHCOCK, Dean College of Engineering, Ohio State University. It often happens that in our discussion of changes in courses so much is based upon opinions only and very little upon facts. Facts are what we want if they can be obtained. I wish, therefore, to pass on to you some experience having a bearing upon the matter under discussion.

For two years now it has been my custom to invite the senior class to a conference, at which several questions are put to them, usually of a constructive character and which will be of assistance or guidance in determining changes. The time of this conference is just before Commencement Day, after all work is completed and the student's degree has been voted him. At such a time he feels free to express his opinion and I certainly have a great deal of respect for the views of men after they have spent four years of hard work at our university.

After the conference of deans at Chicago, I reported back to the engineering faculty the action taken and in the discussion which followed the statement was made that very few students would take a five-year course if one were offered. In order to check this statement I presented to this group of seniors, 74 in number, the proposal of the deans, asking them how many would continue for five years under such a program. Of the 71 who replied, 51 stated that they would take five years or would like to have done so if financially able. This little test demonstrated that our opinions do not always accord with facts.

DEAN McCaUSTLAND. The curriculum submitted is consciously planned to avoid the specific engineering applications during the first two years, with the possible exception of shop and surveying. These courses, however, must not be narrowly vocational in their scope.

The third year introduces the student to physics, geology, and economics. In physics, in engineering problems, and in mechanics there is offered opportunity to become familiar with the uses of mathematics in dealing with specific problems.

In the fourth year an introduction is given to the fields of electrical machinery, heat machinery, machine design and structures, and in all these cases emphasis is laid on the necessity of a thorough understanding of the fundamentals in these fields. With this arrangement it is believed that the student will be better prepared to grow in the profession of engineering

than if he completes a course with a greater amount of specific material of a professional type and spends less time on general training. This is my answer to the charge that the student is not prepared for anything specific at the end of the fourth year.

Objection is also made to the rigidity of the fifth-year schedule. I believe that criticism is well taken, and in practical administration I should favor modifications, based on the advice of a special committee with whom the student should consult.

On the whole the discussion has been fair and helpful and I want to express my appreciation of the efforts of all who took part, either orally or by written papers.

#### RECOMMENDATIONS

Recommendations, adopted by the section were, (1) authority to publish "Engineering Experiment Station Record, Index and Summary, 1921 and 1922" in addition to the regular quarterly publications of the Engineering Experiment Station Record and allotments to cover the cost; (2) membership on the Advisory Board on Highway Research of the National Research Council; (3) authority for the engineering experiment station committee to arrange a conference between representatives of the land-grant college experiment stations and the Bureau of Standards on questions of engineering standards and standardization; (4) the reappointment of Dean A. A. Potter as a member of the committee on engineering experiment stations for the term of three years.

#### ELECTION OF OFFICERS

Officers for the section for the ensuing year were elected as follows: Chairman, H. S. Boardman, Dean College of Engineering, University of Maine; Secretary, C. R. Jones, Dean College of Engineering, West Virginia University.

Adjourned.

## SECTION OF HOME ECONOMICS

TUESDAY MORNING, NOVEMBER 21, 1922

The meeting was called to order by the chairman of the section, Dr. Louise Stanley, University of Missouri.

The session was devoted to the discussion of general administrative problems.

The first speaker was Dr. Helen B. Thompson, Kansas State Agricultural College.

## STANDARDS FOR SALARIES AND PROMOTIONS

BY HELEN B. THOMPSON

The fact that the word "salary" is defined in our dictionaries as "a periodical allowance made to a person for his official or professional services or for his regular work," prompts us to consider whether the women in home economics are to be listed in the "professional" or the "working" class or whether they must be regarded as belonging to both. It is doubtful if teaching, either resident or extension, can be of any value to an institution if it be regarded as routine work by those who do it. It must have some of the qualities of professional services. On the other hand, strictly administrative positions involve work as well as demands for professional services.

The time given to the task might be taken as a standard for the pay but even in unskilled labor the intensity of the work and the conditions under which it is performed are factors that govern output and make the equal hourly wage unfair. In the skilled occupations and in the realm of mental effort, there are many more factors entering to determine the quality of the output, but both output and characteristics which influence it are intangible or, at least, extremely difficult to measure.

In the fixing of salaries, it seems obvious that one must know what an institution can afford before deciding either a maximum or minimum for any rank of officer or kind of service. By this I mean that the distribution of total funds must be understood by all persons having to recommend budgets, and that maximum and minimum salaries for each rank must also be known. If the minimum for a professorship in one department is above the maximum of professorships in other departments, reasons should appear that can be appreciated if not entirely accepted as just. If a dean in one school or division is paid less than associate professors in other lines of work and associate professors in one department have the compensation of instructors in other departments, it is evident that the salary scale is not connected with rank. The only conditions that will justify such apparent irregularity are: First, possible differences in the intrinsic value of the several kinds of work to the institution and to the State; second, variations in the amount or quality of work in several lines equally valuable in themselves; third, differences, either in native ability or training, of the persons rendering the service. If these then are the bases of just differences in salaries, may we not draw from them the standards by which the scale must be set? For the ideal maximum for a professorship in a division or a department of home economics why not

adopt the maximum for professorships in the whole institution? The officer who will deserve this salary will be the one who by training and experience, natural ability, and capacity for work is as well fitted for her position as the other officers receiving the same pay. The ranks below the professorships and the salaries for each will be determined by the total amount of funds available and the number required on the staff.

The standard was suggested as ideal. There are well fixed and sincere opinions that it can never become real. If one were to rely, in debate upon this point, upon the assumption that home-making is of such importance to the State, that home economics can be second to no other work of the land-grant colleges, she would not infrequently be checked by the remark that, "if we had no agriculture we would not have any homes." She might naturally question, "Who would need agriculture if there were no homes?" Both ideas have force but they fail to bring an agreement in conclusion with regard to equality or difference in value of home economics as compared with agriculture.

There are many who contend that women do not do as much work as other members of the faculty and when one takes a schedule and counts the hours of teaching disproving that statement, the position is usually taken, by one's opponent, "that long hours are given some members of the staff because they can not perform other important professional services; that their work is never improved in quality when they are given less to do."

It is of the greatest importance to our profession that we do not deny these allegations without a thorough investigation and that we face the facts which an investigation in any case discloses. If we can not teach classes at 8 a. m., if we can not give full time and attention to the task in hand for the full hours of scheduled duty, if we spend our energy unduly on housekeeping and afternoon teas, let us not talk of "equal pay for equal work," but let us acknowledge frankly that our pay should fall short in proportion to our self-limited work.

In regard to the differences in persons, mentioned as the third point above, the degree of academic training is the outward evidence of fitness or unfitness, but there are other proofs of ability of great importance which must be considered.

The question as to whether the qualifications for research work and the characteristics of a good teacher must be combined in every member of the staff will need to be answered. If some members have research ability and others who have equal academic training have not, does excellence in teaching offset the lack of research work or should the teacher who does no research be expected to do other productive work, such as writing? What are the personal characteristics most desirable in our staff, and are there any so objectionable as to limit the salary of any one worth keeping on the staff? What are the dangers in basing salaries upon what is commonly designated as "personality" but may be only a pleasant manner, or the ability to carry on polite conversation?

One other difference among persons is the economic burden so commonly offered as a correct standard for salaries, as well as for the minimum living wage. The sociological importance of adequate support for families among the professional class is admitted. Those interested in home economics would not argue that point. If all other qualifications were kept in

mind, we might safely allow the economic needs of the family to become a factor in the salary scale, if all parties would agree to the use of this standard without discrimination and with all its implications. The man with the largest family would then be selected for the maximum salary, the woman with dependents would outrank the unmarried members, and all faculty families would voluntarily ask to have their salaries reduced after their children were started on their own careers. The "economic need" is at best a difficult standard to apply. As used at present it is one of the chief hindrances to a just evaluation of professional merit and a decision upon fair compensation.

The salary scale within our own power to control should conform to the standards we would approve for all. In any department of home economics the first difference in pay should be due to the rank of the office. Within each rank the variation from maximum to minimum should be made for the differences in qualifications already discussed. It seems fair to keep the maximum of each lower rank below the minimum for the rank above. The margin need not be great between associate and assistant professors or between professors and associate professors or deans and professors. Such difference as are made should be due to the responsibilities rather than the dignity of the office in all cases in which training and ability are fairly comparable. The wide gap in the scale should come between the instructorships and the next rank above. Not only should there be a considerable difference in these salaries but for promotion to assistant professorship, graduate study should be demanded.

The promotion in rank on tenure of office alone is certain to limit professional development. We owe it to the younger members of the staff to persuade them to make the preparation for promotion. We can safely demand the equivalent of the master's degree in graduate study for our assistant professors and more extended preparation for the higher ranks. When there are no vacancies and it is not possible to establish additional positions of high rank, we must help our well prepared instructors to positions in other institutions.

Promotions in salaries, without the accompanying rank, can scarcely be justified except in the event of a change in level for the entire budget. The chance to draw a high salary is often interpreted by the immature worker as proof of her earning capacity. The satisfaction in immediate returns blinds her to her need of development for more exacting future responsibilities.

In conclusion, I would say that among the important standards by which salaries should be set and promotions earned, it seems necessary to consider academic training and experience and professional qualifications, such as, fine teaching ability, aptitude for research, interest in professional work, writing included, and a bold desire to make learning the prime object of the student's life.

The next paper was by Miss Mary E. Sweeny, Executive Secretary, American Home Economics Association.

## WHAT CONSTITUTES A TEACHING LOAD

BY MARY E. SWEENEY

I think those of us who have been teaching home economics realize that we can scarcely discuss the teaching load itself because there are so many factors that enter into home economics teaching that do not enter into the work of other lines of teaching. May we not, therefore, discuss some of the bases of the teaching load.

In discussing this matter with heads of departments, with the teachers themselves, with deans of agriculture under whom home economics courses are administered, with presidents of colleges, and with various people with whom it has been my good fortune to talk, I have heard it discussed from every angle and based on the clock hour, the student teaching hour, credit hours, the subject matter taught; the character of the laboratory teaching, number of laboratory notebooks, individual attention needed by students, difference between handling large laboratory sections and smaller ones, and field work. These are the principal factors which have entered into the matter of the teaching load.

The teaching load based on the clock-hour teaching has been more or less discarded, although we still hear it spoken of as essential. The bases generally accepted are student teaching hours, including laboratory and lecture, semester credit hours and character of the subject matter, if lectures whether it requires outside reading, research and investigation, and it is well to remember that in presenting some laboratory teaching as much work and preparation is demanded as in presenting a lecture. Undoubtedly more attention should be given to the number of student teaching hours than has been given, not that it is suggested that this be the only basis, but there is a difference, as every one present can testify, between handling a larger group and a small group of students and that numbers do inject a very definite factor into the teaching load.

Deans of agriculture and administrators in related lines of college work have brought to our attention the number of notebooks required in home economics courses and some of them have even dared to say we are firmly bound on all sides by them. If the notebook is of value to the student and an index to the teacher of the student's development it must be carefully examined. The actual human labor involved in examining them might become a distinct load in itself, a load, which I believe discourages many young teachers, for to them seems to gravitate the correction of all notebooks. The more experienced teacher usually looks upon them with dread and if the teacher shares some of the administrative responsibility it is well nigh impossible for her to carry her teaching load.

Another factor, not apparent in the teaching load, reckoned in either the semester credit hours or the student teaching hours, is the individual attention needed by students and demanding on the part of the teacher frequent conferences and assistance amounting in many cases almost to individual education.

In recent years throughout this country, field work in home economics has developed rapidly and we are familiar with it in nutrition classes, social service work and practice teaching. Necessarily the teaching hours of the person in charge of such work must be fewer, conferences must be frequent and observation constant and the teaching load measured in either

credit hours or student teaching hours seemingly light. This group could well make a study of the amount of field work which constitutes a reasonable teaching load.

Again the question arises as to the character of the load and its physical requirements, when one considers the practice house. A group of four girls in a practice house can demand a large share if not all of the full time of one instructor, so that shown in student teaching hours it indicates a comparatively light burden, but I hardly think any one wants to change places with the professor who lives in the practice house.

These, briefly outlined, are some of the questions which need consideration in studying the teaching load with reference to offering of subject-matter courses.

Many colleges are beginning to give very definite consideration to the extra-curricula load, incident to membership on the general faculty, and participation in the administration of college business problems. For terminology and definition of this load I am indebted to a study which has been made at Stephens College. This extra-curricula load is considered in terms of major responsibility and minor responsibility.

In major responsibilities are included membership on standing committees of the general university faculty which demands regular meetings and carry specific duties such as the scholarship, graduate, advanced credit committees; in minor responsibilities such special committee work as study of special problems before the faculty. All standing committees involve a very considerable amount of time, and by many are held to be a legitimate part of the teaching load. If a number of land-grant colleges within the next year would make careful studies of the character and extent of the extra-curricula load some basis for judging it could be developed.

Within the home economics faculty itself we have the similar major and minor extra-curricula load and the teachers are responsible for committee work dealing with the course of study, arrangement of schedules, improvement of teaching, faculty seminars and every land-grant college has a farmers' week. Absolutely no one who has not lived through it can realize what it means in the life of the home economics department. Not only the whole faculty personnel, but the whole student personnel as well is put at the disposal of the State, and for weeks and weeks you plan for it, one week you live through it, and the rest of the year you get over it. The amount of time spent in preparing for farmers' week is assuredly a major responsibility of extra-curricula load which ought to have recognition in the teaching load which is assigned to women in home economics.

As minor responsibilities are surveys of work within the home economics department, committees on related science and art, advisory committees on student activities such as the Y. W. C. A., student council, social life. In addition is the annual pageant and the home coming, and boys' and girls' club week. While we are not responsible directly for these, we are usually a necessary "participant." To the institutional management department usually comes the "extra classroom" duties of serving alumnae banquets, caring for reunion dinners, providing for the crowds during Farmers' Week and Commencement.

It would be interesting to study the teaching load and extra-curricula load of the home economics professor in comparison with that of the professor of English, mathematics, or chemistry.

We agree, undoubtedly, that it is one matter to discuss the teaching load of the home economics faculty, as represented by classroom work, and another matter to discuss the teaching load with the addition of the extra-curricula load from the general faculty and from the departmental faculty. If in addition to the teaching and extra-curricula loads there is superimposed an administrative load, the question of time allotment assumes thought-provoking proportions. The survey of teaching load reported in the October, 1922, *Journal of Home Economics*, by Miss Whitacre must have discouraged many of us, showing as it did the failure to differentiate between the faculty member with no administrative responsibilities and the head of a department.

One question which can be considered very properly by this group since it is responsible for the home economics work in land-grant colleges, is, Should the administrator teach and, if she teaches, what is a reasonable amount for her to carry? Personally I think that the administrator gains by carrying a small number of teaching hours. It keeps her touch-point with the students, makes her conscious of the problems of the teaching staff, she becomes a real person to the students rather than an administrator only. On the other hand, there is always on the administrator's part a tremendous pressure for time—time needed to prepare kind of lecture and laboratory material she believes in, time for reading related scientific material, time for thinking through your own work.

In trying to carry administration and teaching, faculty committees do not regard your lecture hours and you dash all too precipitately from a committee meeting right into a lecture. The result is that your class does not get the best of you that there is to give, you do not go to your work with poise, power, and in state of mind to present it in the way you would did you not have those administrative duties. I believe if home economics administrators really told the truth about themselves they would say it was a perfect bugbear to look over the required readings, the examination papers, and the regular routine work, and that we have neither the time for their thoughtful consideration, nor human energy to do it in the way that our responsibility to the students demands.

The demands of women's organizations outside the university should be considered in studying the load of the administrators who teach. It would not be far wrong to say that every woman here has at some time been the chairman of the home economics department of her State federation of women's clubs, has taken part in the work of the League of Women Voters, acted as adviser to parent-teachers' associations, participated in extension courses, farm schools, and served the women of the farm bureau.

The question arises whether if colleges consider these participations in outside organization part of the function of the home economics department head, should not adequate provision be made for assistance in administration either by lightening the load of one or more professors, making them free for a given time to assist in administering, or employing an assistant head of the department.

The question arises at once on the part of college authorities, Where is the money to come from for this increased administrative staff? We grant the cost of college education already is great, but home economics heads can not be in the field lecturing or attending farm schools and at the same hour back at college administering the affairs of their department.



If the colleges want home economics work of college rank, with high standards, they must have the same number of personnel to produce it that they have in other departments. This group here today can well be the first to thoroughly study the situation in land-grant colleges, make comparative surveys, and with the facts before them recommend to college administrators such measures based on justice and future growth, as will tend to give the best utilization of the time of a head of a department.

Some information recently available through a report of the Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts of the Association of Land-Grant Colleges<sup>1</sup> established from a survey of all land-grant colleges in this country shows the normal full-time teaching load, in semester credit hours per week, is from 9 to 37 hours. The median is 16 hours. As reported, 1 college has 9 hours, 17 have 15 hours; 9 have 16 hours; 19 have 18 hours, and 3 report 24, 35 and 37. Of the teaching load in some institutions 20 percent is lecture and 75 to 80 percent laboratory. The number of (clock) hours when carrying laboratory only is 20 to 32—but only when no lecture is given, and some one else is responsible for planning laboratory work. The number of teaching hours also depends on whether the work requires careful preparation, that is, whether it is recitation and laboratory or purely laboratory period.

The question of the teaching load involves not only semester credit-hours, but the important factor of the number of subjects taught. It was surprising that 60 percent of the teachers in land-grant colleges confine work to one subject, 12 percent teaching more than two subjects. As a rule, home economics and vocational education teachers carried on an average 3 and 4 subjects, in contrast to agriculture which carried one, such as poultry or farm mechanics. It is interesting to note by way of contrast that 32 percent of the staff in home economics carry one subject where 70 percent in agriculture carry one; 25 percent in home economics carry 2 subjects and 18 in agriculture; 18 percent in home economics carry 3 and 9 percent in agriculture; 10 percent in home economics carry 4 subjects and 2 in agriculture; 4.5 in home economics carry 5 and 0.7 in agriculture; 9.8 percent in home economics carry more than 5 and none in agriculture.

The distribution of courses among the teaching staff was exceedingly interesting also. Thirty-two percent of the home economics instructors carried one subject, 74 percent in agriculture; 37 percent home economics 2 subjects, 20 percent in agriculture; 25 percent in home economics 3 subjects, 4 percent in agriculture; 5 percent in home economics 4 subjects, 2 percent in agriculture. Assistant professors, 30 percent in home economics carried 1 subject, 65 in agriculture; 14 percent in home economics 2 subjects, 21 percent in agriculture; 22 percent in home economics 3 subjects, 7 percent in agriculture; 11 percent in home economics four subjects, 3 percent in agriculture; 7 percent in home economics 4 subjects, none in agriculture; 18 percent home economics 5 subjects, none in agriculture. Associate professors, 75 percent in home economics carry 1 subject; 60 percent in agriculture 1 subject, 18 percent 2 subjects, 7½ percent 3 subjects; 3 percent 4 subjects, and 1 percent 5 subjects. Professors, 16 percent home economics 1 subject, 71 percent agriculture; 25 percent home economics 2 subjects, 15 percent in agriculture; 16 percent home economics

<sup>1</sup> Proc. 35th Ann. Conv. Assoc. Land-Grant Colleges, 1921, p. 94.

3 subjects, 9 percent agriculture; 20 percent home economics 4 subjects, 1 percent agriculture;  $8\frac{1}{2}$  agriculture 5 subjects, 0.6 agriculture; 14 percent home economics more than 5.

The questions following in relation to the teaching load, it seems to me, arise: (1) What in view of home economics as a new developing group of subjects, with subject matter changing constantly, demanding outside reading, graduate work, research, can be regarded as a legitimate teaching load? (2) Shall extra curricula load be evaluated and included in teaching load, and if so, how much? (3) Shall we try to express the extra curricula hours in terms of semester credit hours? Shall we add these to our teaching load or shall we regard them as some of our outside responsibilities?

Other questions that I think we need to consider are, Can the home economics teacher carry a heavier curricula load than the agriculture teacher and do the grade of work she wants to do? (2) Of our extra curricula load, how much is traditional, how much willed to us by predecessors, and how much is essential?

#### COMMITTEE ON TEACHING LOAD

There was considerable discussion of the three points raised in the last paragraph of Miss Sweeny's paper. It was the feeling of those present that the home economics teacher bears a considerable and in many cases a variable number of extra curricula activities which makes it impossible to compare her teaching load with that of some of the other teachers in the universities. As a result of this discussion it was deemed wise to appoint a committee to consider more definitely these problems as they relate to home economics teaching, the questions to be investigated being:

- (1) What is the best measure of the teaching load?
- (2) How far must we consider extra curriculum activities in determining upon a teaching load for a given teacher?
- (3) Can any plan or point system be devised which will enable us to have a more equal distribution of extra curricula activities?

The committee appointed is as follows: Chairman, Faith R. Lanman of Ohio; Helen L. Davis of Oregon; Inga M. K. Allison of Colorado; Jessie Whitacre of Utah; Katherine Jensen of Idaho.

The following paper was presented by Miss Flora Rose, New York State College of Agriculture:

#### THE RELATIONSHIP BETWEEN ADMINISTRATIVE OFFICERS AND TEACHERS

BY FLORA ROSE

A relationship between individuals or groups of individuals implies some form of kinship, either of family, of interests, of associations, or of responsibilities. To define a relationship is to analyze it into these elements and to determine wherein lie common interests and mutual responsibilities. The nature of the relationship will be the product of its associations and the result of their functioning.

The relationship between administrative officer and teacher is best surveyed by charting what may be considered in the light of the history of

organization as the common duties and responsibilities of each and points where these meet.

In any organization which is large enough to have special officers appointed to administer its plans there are three definite phases of administration to be considered.

First, there are laws to be enacted, or rulings to be made, or policies to be defined, or plans to be outlined which are essential for the good of the organization. This may be called the legislative phase of organization.

Second, there is the obligation to finance the organization, the responsibility for its progress and development as a whole, responsibility for administering plans, enforcing laws, setting policies in action, maintaining standards, and administering funds. This may be called the executive phase of organization.

Third, there are group problems where a deciding voice is needed. There are difficulties within the organization and between the organization and the public which need to be adjusted. There is a balance to maintain. There is the necessity for interpretation between the public and the organization, and there is counsel to be given. This is the judicial phase of organization.

In any scrutiny of organization involving administrator and teacher, it seems to be desirable to chart the relationship between these two groups on the basis of their functioning together in the various phases of the work.

POSSIBLE MAIN RELATIONSHIPS BETWEEN ADMINISTRATIVE OFFICE AND TEACHER  
IN ANY EDUCATIONAL ORGANIZATION

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*Legislative functions*

*Of administrative officer*

To work out plans with individual teachers.

To work with the organization or group (teachers and other administrative officers) in making plans, and defining policies affecting the group.

To develop with the teachers (and a student council) courses and curricula.

To define any policies for the organization (if on analysis there prove to be any) which do not affect the group.

*Of teacher*

To make plans for own work in council with administrative officer.

To form one of the group to organize plans affecting the group.

To form one of the group developing courses and curricula.

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*Executive functions*

*Of administrative officer*

Responsible—

For securing and allotting funds.  
To the public for the use of funds.

For the progress of the individual teacher and the work of the group as a whole.

For administering plans and policies made by the organization.

For maintaining the standards of the group and of the individuals in the group.

To the public for the work of the individual and of the group.

To the field for the student.

*Of teacher*

To make right use of funds.

For administering such a part of plans and policies as affect the teacher's work.

For maintaining standards.

To the administration for the progress of student.

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*Judiciary functions*

*Of administrative officer*

To establish such interrelations between individuals and groups as will promote mutual understanding of subject matter, of method and of point of view.

To act as mediator between students, staff members and other offices.

To interpret organization to public and public to organization.

To give counsel to teachers and students.

To preserve a balance between pieces of work.

*Of teacher*

To aid in promoting understanding of all pieces of work.

To act as mediator between students.

To interpret organization to student and student to organization.

To give counsel to students.

dents.

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It would hardly seem to make a complete story, however, if in this relationship between administrative officer and teacher, there was not a word introduced concerning the necessity for considering the student. Thus far in our educational organizations, the student has been a passive participant. The time is at hand, however, when in all three phases of organization the student should be introduced, even if very gradually at first, as an active participant in enacting laws and formulating policies for his own education, in establishing councils for the benefit of the organization, and even to aid in setting to work many of the plans of the organization.

DISCUSSION

In discussing Miss Rose's paper the main point brought out was in how far should policies be worked out through committee organization rather than imposed from above by any administrative official. The group seemed to agree that, while traditions grew up in a department which determined in a somewhat natural way the line of development in that department, if certain other policies were worked out by faculty or student groups depending upon the type, we could get very much better cooperation of all those concerned.

A COLLEGE HEALTH PROGRAM

In the absence of Miss Jean Krueger of the University of Wisconsin, who was to discuss this subject, the chairman set up very briefly the principal points in the question, "What Can We Do Toward Working Out a College Health Program Cooperating with the Dean of Women, the Health Service, and the Department of Physical Training," as follows:

**THE CHAIRMAN:** Most of our institutions now have a health service which gives clinical advice to the students. We are recognizing now the need for a preventive side to this service. The factors entering into such a program are as follows:

(1) A thorough medical examination with special recommendations for any corrective measures needed either by clinical treatment or through corrective gymnastics.

(2) A regulation of the social schedule so that there will not be excessive hours spent in social activities by any of the students.

(3) A study of the condition of nutrition of the students, and of the available food supply of the college community with recommendations as to the improvement of both.

This indicates the group most interested in the health program, particularly of the women students of the universities and colleges. First, the medical examiner; second, the head of the division of physical training; third, the dean of women; fourth, the head of the department of home economics, or a special representative of that department interested in nutrition, might well form a faculty committee for preventive service in helping develop the health of the women students.

This committee might function in either of two ways. It might be a standing committee appointed by the president, initiating policies and imposing them so far as possible upon the student body. Or, in line with the preceding paper and also with the prevailing attitude towards self-government, it would seem desirable to have the work carried on by a student committee appointed from the student body with the faculty committee acting in an advisory capacity.

The advantages of such a committee are quite obvious. It means a smooth working program to the end of advancing the health of our women students. I wish to call attention especially to what seems to me to be the advantages particularly to the home economics teacher.

First, it seems to me that it is educational in that it furnishes motive for much of our nutrition work which has been given in a more or less abstract form.

Second, it helps to make our work function as it should. We are all of us aware of the fact that much of the home economics instruction has failed to function in the better health of our students.

Third, it gives us an opportunity to reach all of the women in the university rather than to limit our work to home economics students. I should be very glad now to have some discussion of what has been done along this line in other institutions.

After a brief discussion it was discovered that although this work had been initiated by several universities and colleges, a well defined program was not available, therefore, it was voted that a committee be appointed to consider this matter and, if possible, to report during the spring such a program which could be put into effect for next year.

#### COMMITTEE ON COLLEGE HEALTH PROGRAM

The committee appointed is as follows: Chairman, Edith P. Chase of Pennsylvania; Edna E. Walls of Iowa; Stella Palmer of Arkansas; Florence Harrison of Washington; Margaret Sawyer, American Red Cross.

TUESDAY AFTERNOON, NOVEMBER 21, 1922

The meeting was called to order by the chairman of the section, who introduced Mrs. Henrietta C. Calvin, United States Bureau of Education, who presided during the afternoon session, which was devoted to discussion of improvement of college teaching.

Miss Anna E. Richardson of the Federal Board for Vocational Education presented the following report:

## RECOMMENDATIONS OF COMMITTEE ON INSTRUCTION IN HOME ECONOMICS

I wish at this time merely to recall the recommendations made last year by your sub-committee on home economics of the Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts of the Association of Land-Grant Colleges, for in arranging the program for this meeting your chairman has carried out the suggestions of your sub-committee and the main recommendations made last year have been made the topic for discussion in this afternoon's program. Briefly summarized the recommendations made last year at the New Orleans meeting<sup>1</sup> are as follows:

(1) A recommendation as to the preparation of members of the home economics staffs.

(2) That the departments of home economics in the land-grant colleges assume responsibility for the improvement of the teaching methods of the members of the home economics staffs.

(3) That the home economics departments devise ways and means for providing opportunity to improve the teaching methods of the home economics staff.

(4) That opportunity for larger contact with the vocation of home-making be offered to the members of the home economics staff.

(5) That an adequate method of measuring the success of college teaching be devised.

(6) That the Section of Home Economics consider the points which should be taken as a basis for promotion.

The report of the Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts for this year will be read before the general meeting. Its recommendations will be found on page 81. I would like, however, to present to you this afternoon a few additional recommendations which are made by your sub-committee on home economics. These recommendations follow:

(1) That in connection with the improvement of college teaching one of the most important factors which prohibits the home economics women availing themselves of the opportunity offered by their institutions is the amount of teaching which the members of the home economics staffs are required to do. This not only involves the teaching load, in hours, but includes the wide variety of subjects for which many members of the home economics staffs are responsible. It is, therefore, urged that the administrators of the home economics departments and divisions consider seriously this question in an effort to provide larger opportunity for the improvement of college teaching.

(2) In considering the problem of improvement of college teaching it is urged that the home economics divisions consider the two problems, selection of teaching material, and the method of presenting this material. There seems to be need for strengthening both.

(3) There is a special need for developing research work in home economics education. If home economics college teaching is to develop in accordance with the recommendations made by your committee it is imperative that the home economics divisions, in cooperation with education departments, pay more definite attention to the development of research along the lines of teaching in the technical fields.

In this connection a letter was sent to the administrative heads of the home economics departments of all of the land-grant colleges asking for

<sup>1</sup> Proc. 35th Ann. Conv. Assoc. Land-Grant Colleges, p. 335.

information in regard to any research in home economics education undertaken. Replies were received from 28 land-grant colleges. Three stated that they had undertaken definite work in research in home economics education and that theses had been prepared in part fulfillment of the requirement for the master's degree. The following were the titles of the theses: Suggestions for a Course of Study in Foods to be Used in the Junior High School. Significant Aspects of the Home-maker's Occupation in Different Economic and Social Levels. Analysis of Text-books in Clothing and Textiles. Investigation for the Purpose of Ascertaining Certain Important Cost Elements in Home Economics in State-Aided High Schools. The Clothing Course for the High School.

Three institutions report work which they are scarcely willing to call research, but which might be called educational investigation and probably at this stage a request asking for special investigation would have brought much larger returns as the institutions are probably better prepared to do this than they are to do work deserving the name of research.

Three institutions report that they are recommending graduate courses in home economics education and one makes the following statement:

"We have done a good deal of preliminary work in the reorganization of new courses and the measuring of teaching results which will help toward the foundation for future research work."

Apparently there are eight or nine institutions which are working definitely on the problem of developing research in home economics education.

(4) The fourth recommendation is a little outside the field of your committee but it seems important to call to the attention of administrative women in home economics the question of mental tests as applied to college students and particularly to ask their help and cooperation in studying the type and value of the intelligence tests as applied to groups of home economics students and also in assisting in making available information gained through such tests.

ANNA E. RICHARDSON,  
MARY E. SWEENEY,  
BERTHA M. TERRILL,  
*Sub-Committee.*

After some discussion, the report was, on motion, approved.

The next topic in the program was discussed by Miss Faith R. Lanman, Ohio State University, as follows:

#### WHAT STANDARD SHALL WE SET FOR A BACKGROUND OF VOCATIONAL EXPERIENCE FOR COLLEGE TEACHERS AND HOW SHALL IT BE ACQUIRED?

BY FAITH R. LANMAN

It is well that this topic is stated as a question. I fear that it will remain a question for some time to come. Similar topics have been discussed at previous meetings of this organization and in every instance the discussion has emphasized the difficulty of defining what home-making experience shall be expected either of students or of the faculty, or how it shall be acquired. I am still ignorant on the subject, but I am sure that

during the past few years some progress must have been made and that you have a contribution to offer. At least we are seeing the problem.

I have reviewed with interest past reports of the Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts and quote the following from that of 1920:

"What shall be said of the relative value of professional engineering experience for teachers of mechanical engineering; of shop experience for shop instructors; of being farm reared or city bred with two or more years of farm experience for teachers of agriculture; of experience in making clothes on the family sewing machine or in the dressmaking shop for the teacher of clothing. Nobody yet is prepared to answer these questions, but they are coming to be of sufficient importance to warrant careful study with a view to developing standards and measurements of the values of vocational experience."

As vacancies occur or as our work enlarges, we have the responsibility of finding teachers whose qualifications most nearly meet the need, and while vocational experience is desirable, I hope that we shall never have to conform to any definite regulation as to actual time spent in practice for I feel that we might be led into underestimating some of the other qualifications which might counterbalance much experience, such for example, as open-mindedness, breadth of vision, power of growth and habits of self-improvement which mean a capacity to gain both knowledge and experience. If we succeed in formulating definite standards for vocational experience, I hope that we may reach a nice balance in our ideals of an efficient home economics teacher.

The problem of finding home economics teachers with a full complement of desirable qualifications is greatly enlarged by the fact that many of our graduates teach but a few years and then establish homes of their own, but as the number of graduates increases there will be an increasing number of them who will return to the teaching field enriched by several years of successful home-making experience. There is great advantage in securing the service of such women after they are, in a measure at least, relieved of home duties. We must increasingly look for the services of mature women who have the happy combination of training either preceded or followed by home-making experience and preferably those who have reared children.

As soon as we undertook to teach women, as in extension work or vocational evening schools, we began to realize that persons engaged to do that work must have first-hand knowledge of dealing with real problems, and the need in those cases has helped us to the realization that we have in too many cases been putting up in our regular school and college classes with teachers who have never applied their training and whose teaching is as a consequence artificial and ineffectual.

Beside general home-making experience, I am sure it is agreed that certain phases of home economics make it highly desirable that anyone who would undertake to teach them have experience in the commercial world or in social service. More and more teachers of clothing, for example, are learning technique and construction from actual trade work and are valuing any contact they can make which enriches their knowledge of fabrics and manufacture.

From the report of 1921 of the Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts, I note under the heading,



"Keeping Up-to-Date in Vocational Practice," that there is a general opinion among administrative officers in the land-grant colleges that vocational practice related to subject matter is beneficial. The amount desirable probably varies with each individual case, but there seems to be a general belief that all can spend some vacation time to advantage in vocational practice. One definite limitation is mentioned and that is that teachers should not assume responsibility for outside enterprises to an extent to cause worry or heavy financial obligations. It is stated in the report that many make a practice of spending vacations in shops, on farms, and in home-making, and indicates that there is a good proportion of home economics teachers who do so. It is indicated that a majority of the persons who replied to questionnaires sent out by the committee approved of employment for pay in vacations, if the work is related to teaching and does not interfere with it. The report says that many who expressed themselves as being favorable toward outside employment were influenced by low salaries, but that many urged the point regardless of this consideration because they believed that the experience enriched the teaching.

To quote Miss Whitacre of the Agricultural College of Utah, "Vocational experience, it seems to me, should be measured, not in terms of time but rather by the ability to create high-grade products and to manage or direct the producing activity of others; that is, the measure should be an acceptable degree of skill in the line taught," and to quote Mrs. Walker of our department at Ohio State University, "You can not teach clothing budgets if you have not made clothing budgets and kept accounts."

While I believe that our first duty in maintaining an efficient instructional staff is to choose wisely and give every possible opportunity for improvement in service, the whole question resolves itself into that of preparing future teachers.

It is true that too often our graduates fail to measure up when tested by the actual problems of life and work, but, I believe, that this is less and less true in proportion as we realize the necessity of training workers rather than of merely teaching subjects such as chemistry, clothing, and foods. I believe that a student who gains a sense of personal responsibility with enough information to make him modest, who acquires a habit of applying his knowledge to new situations, and who establishes high standards of workmanship reflects more credit upon the institution from which he graduates than one who succeeds in learning many more facts without gaining the sense of responsibility, the intellectual modesty, and the habit of applying the principles he has learned.

I am convinced that one way to vitalize college teaching is through the much discussed project method. If rightly used this calls for an analysis on the part of the student as to the principal omissions in his own previous experience and results in an appraisal of his own personal accomplishment in a definite undertaking. Both to train them in the use of home projects in their teaching and to supplement their experiences in vocational practice, the students in our methods class have each undertaken a home project with very interesting and worth while results.

Without doubt the requirement of home-making experience imposed upon vocational teachers has emphasized the importance of a degree of home-making efficiency as a part of the preparation of home economics teachers, but I am not aware that any really definite standard has been

set. The problem of measuring home-making experience is most difficult because of the very nature of it. Everyone helps or hinders in making successful the home in which he lives, be it typical or not, and of high or low standard.

It may be of interest to state the facts as to previous home-making experience of 43 students in our methods class of last year. It was estimated that each girl had on the average three years actual home-making experience of some sort, ranging from six months to fifteen years and that each one had on the average the whole managerial responsibility six months, ranging from one week to nine years. Of course we realize that the value of the experience probably varied as greatly as the range of periods, and we are not sure just what it means in each case.

If the question which we have been discussing is deemed worthy of attention, I suggest that a committee be appointed to secure data and recommend standards for vocational experience for college teachers of home economics.

#### COMMITTEE ON VOCATIONAL EXPERIENCE

There was some general discussion from the floor which culminated in the recommendation that a committee be appointed to make a special study of: (1) Forms of vocational experience most desirable for the college home economics teachers; and (2) amount of such training that should be required. The members of this committee are: Chairman, Rachel H. Colwell of West Virginia; Nellie Crooks of Tennessee; Edith Pierson of South Dakota; Alice L. Edwards of Rhode Island; Bertha M. Terrill of Vermont.

Dean W. W. Charters of Carnegie Institute of Technology, Pittsburg, was introduced and spoke as follows:

#### HOW MAY WE IMPROVE THE TEACHING METHODS OF THE COLLEGE STAFF?

BY W. W. CHARTERS

I can not refrain at the outset from commenting upon the significance of the report from the committee just presented by Miss Richardson, upon the requirements of professional training in educational psychology and methods of teaching for all instructors in home economics, mechanical arts, and agriculture in the land-grant colleges. If this recommendation receives the approval of the Association of Land-Grant Colleges it will be the most significant thing that has happened in college education in many years. You are pioneers in this respect and the proposal constitutes an epoch making recommendation. These three great vocational divisions within the land-grant colleges and universities have taken a forward step of no mean significance and importance.

I ask you to consider with me today the problem of training college teachers. In my presentation of the case I shall have little to say concerning general theories because I prefer to base my observations upon a few important studies that have been conducted here and there.

There are in general three lines along which improvement of methods of college teaching is proceeding. The first of these is the provision for

undergraduate courses in education for those who expect to teach in college. Occasionally these courses are offered in the graduate school. A second method that is commonly used is a short intensive course for a week during the year during which a specialist in education discusses problems of college teaching with the staff and in consultation with them prepares a program for consideration during the year by the college faculty committee on instruction. The third method which I shall discuss at some length is the training of teachers on the job through weekly conferences and observation of their teaching.

As a basis for my discussion, which I can summarize in a short statement of methods at the end, I shall describe a project which we have been carrying on at Carnegie Institute of Technology for the past three years.

When I became connected with the institution I found that in the four divisions of engineering, industries, fine arts, and the women's college, there were a number of teachers on the faculty who had not had any sort of specific and formal training in methods of teaching. We found also that while many of the experienced teachers had worked out excellent methods of teaching by themselves, the younger group of inexperienced teachers could be benefited by some sort of formal training. This led us to propose a voluntary seminar to last for a semester and meet once a week.

We were at once faced with the problem of what to include within the course. I knew a good deal about elementary and high school methods but little had been collected or published about methods of college teaching. In this situation we fell back upon the idea of job analysis. The instructors who enrolled for the seminar were asked to make a list of their duties as teachers and to indicate those with which they had the greatest difficulty. As a result of this analysis during the first semester we obtained a list of fourteen practical difficulties, such as: The methods of grading papers and grading students; methods of apportioning the work to the time so that the material would not run out before the end of the hour or before the end of the semester; methods of getting the interest of students; methods of getting them to work hard. It will be noted that these are very real and vital problems which the young instructor actually faced and upon which he was looking for aid.

At this point I had a mild inspiration. If you have ever worked in a department of education you know that the instructors in subjects outside of education are likely to view you with suspicion. They are inclined to ask themselves subconsciously, "What does Mr. Charters know about teaching my subject, since in all probability he has not had even an elementary course in it?" The student instructors are likely to ask the same question which becomes a real obstacle in getting motivation. To obviate this difficulty I said to myself, "There are on this faculty a number of very excellent teachers. They have never had any formal courses in education, but during their five or ten or fifteen or twenty years of experience they have worked out a number of excellent methods. They are men of ability and when they meet difficulties in teaching they solve them with intelligence. On the other hand, there is nothing in the books about college teaching. My best line of procedure is to find out how the excellent teachers on the faculty handle these specific difficulties which the young instructors in my seminar are facing."

I therefore trained these young men and women to become interviewers. We selected thirty good teachers on the faculty and had each of them interviewed by one of the group to find out how they handled the fourteen difficulties with which the young people were having trouble.

This proved to be an excellent plan for three reasons. In the first place, possible criticism of the course was forestalled because the education department did not seek to dictate methods of teaching subjects, it merely collected and interpreted the best methods that were in use. In the second place, we discovered a body of methods that was more than respectable, it was fine. Many of the methods used had not appeared in print and were unknown to the instructor. One might say that some of the instructors were unconscious of some of the important problems of teaching. It is sometimes claimed, by those who do not know, that all college teachers merely lecture and have no discussions, that they are formal and not practical. But among the people who were selected we found a great many who were using all the latest methods which are being described in educational literature. We found, for instance, that the project, about which we have heard so much today is being used by many instructors. The electrical engineering department was taking old machines, disconnecting them, and asking the students to put them together so that they would run. In the performance of this operation they learned a great deal about electricity by the project method.

In the third place, the young instructors were brought into close personal contact with the more experienced instructors. They found that the older teachers were very willing to be interviewed. The shortest interview was one hour, the median an hour and a half, and the longest five hours, with the interviewer prostrated and the instructor still going strong. The members of the seminar told me over and over again that this opportunity to have a heart-to-heart talk with older instructors whom they would not otherwise have had the temerity to approach, was the best single value in the course.

When the thirty replies to each difficulty were collected they were organized into a pamphlet which was mimeographed and used in the seminar. It was later handed down to succeeding groups as the contribution of the first group.

The second group taking the course provided as its contribution an analysis of the difficulties of getting students to think. These included such difficulties as locating problems, gathering data, finding and weighing hypotheses, methods of verification, intelligence in thinking, and teaching scientific terminology.

One very interesting fact was revealed. I think it is correct. It appears that in the inductive sciences, such as chemistry and physics there is less opportunity to train people in the processes of reasoning than there is in some of the less exact sciences. It seems peculiar that in these sciences which have been developed upon the basis of inductive reasoning this should be the case, and yet upon further consideration the reason is clear. In the complete act of thought the individual has to locate problems, guess at solutions, elaborate them, and verify them. But in physics, for example, however, the technique of investigation is so refined and the equipment so elaborate that it is not possible for all the principles to be developed inductively. As a consequence the students are given the prin-

ciples and are asked merely to verify them. They are only occasionally able to discover them. In sociology, on the other hand, which is one of the more indefinite subjects, it is possible to give a great deal more practice in reasoning. A student can collect the data, form hypotheses, elaborate them, and verify or discard them. Since the procedure is not so refined as in the exact sciences it is more nearly within the student's ability, and he is, therefore, able to find more problems which give him the opportunity to make intelligent guesses and pursue them to their final outcome.

In the third year the students had at hand the organized reports of the two preceding groups and proceeded to an analysis of the difficulties encountered in shop and laboratory teaching. At the end of the semester they had gathered through the interviews a number of methods used on the campus.

I propose some such method for the heads of the departments in home economics. It is an excellent thing to have undergraduate courses given. It is valuable to provide intensive courses for a short period, but it is extremely valuable to have a weekly meeting with the young instructors who have had no experience in teaching. They should be gathered in a group of two, three, five, or more, as the case may be, and with them may be used the methods which I have described. A difficulty analysis can be made and this may furnish the topics for discussion one week after another until they have all been touched.

It is not necessary to depend entirely upon interviews. The literature of educational psychology and methods of teaching can be utilized. For instance, if the instructors have difficulty in remembering names and faces and if their students have trouble in memorizing the most important parts of the subject, they can be trained not only through the material obtained in interviews but also by reference to the laws of learning as described by Thorndike and others and adapted by the authors of textbooks on the methods of teaching. This is essentially the project method of teaching education and psychology. The members of the seminar will be brought in contact with eight or ten books which otherwise they would probably not read. In these books they will be referred to specific principles and methods and when they get through they will have a practical acquaintance with much of the theory of psychology and methods of teaching.

The question arises as to whether or not this seminar can be conducted by the head of the department. My opinion is that, on the whole, if it is possible to get a member of the department of education to conduct the seminar, it is desirable to do so. He knows the literature from which to select and is able to direct the young instructor to it somewhat better than can the head of the department, unless she has had a great deal of training in education. If, however, it is not possible to find exactly the right kind of person, who commands the confidence of your group, then the head of the department of home economics, after consultation with the department of education, can secure references and other material and carry on the course herself.

The seminar ought to be followed by specific "training on the job," by visiting the classrooms of the young instructors, sympathetically watching them teach, and suggesting methods of improvement. The art of teaching is learned most efficiently when training on the job is given. In-

deed every art is learned best in this way. For instance, in learning to be moral the mother and the pastor each have a part to play. The pastor on Sunday lays down the general principles and the mother during the week sees that they are applied. The pastor alone can not teach children to be honest. The daily contact of the mother is absolutely essential. She is able to say to the boy, "This is honest, that is dishonest. You should do this, you should not do that." Without this supplementary assistance the pastor is powerless. In a similar way the formal courses in home economics teaching have a place. The weekly seminar brings the problems more nearly home to the young instructor, but the detailed criticism of specific methods actually used under the observation of the head of the department is necessary to make the training fully efficient.

Unfortunately, college "ethics" is a handicap. It is considered to be rather bad form for instructors to visit each other's classes. It is true that in every other occupation people like to visit each other and watch others' methods. One farmer will visit another in the fields to study his methods and get his opinions. Business men in situations that are not highly competitive gain experience from each other. But for some reason it is not the thing to do in college classes.

However, in a small, friendly, and compact body like the home economics department, where everybody knows everyone else the ice can be easily broken. What is needed is some sort of faculty action which will encourage the visiting of classes for the purpose of learning how to improve and, in case of the head of the department, for the purpose of watching the young instructors in order to praise and criticize.

A third method of attack may be developed. It is perfectly clear to me, as I have frequently stated, that in many cases people who fail in teaching are unsuccessful less because of lack of information than because of lack of qualities of personality. It is true that sometimes instructors do not have enough information to perform their jobs properly. But it often happens that instructors with an abundance of information fail because they lack certain personal qualities. They may have no interest in students, or may be irritable. Low standards of efficiency, laziness, and lack of interest in teaching may be the causes of failure. Perhaps they do not know the name and understand the personality of each of their students or they may not be able to get along harmoniously with the students or with the faculty.

These personal qualities which are of great importance in teaching can be improved by instruction. The usual method is to leave the development of personality to chance. The instructor comes upon the teaching force either with a good personality or without it. It may grow in strength as time goes on or it may deteriorate; but if the qualities of personality necessary for the teaching job in college are analyzed they can be spread before the young teacher who is just beginning. She can rate herself to see the qualities in which she is at average or below or above. Young teachers are very much interested in this. They are delighted to analyze themselves in order to find out what they are like. They are able to see the points in which they are strong and this will give them confidence. They are able also to discover their weak points and upon these, one by one, definite assignments can be given by the head of the department. These assignments can be just as definite as are those which are given in

chemistry or history. Let us take, for example, such a weakness as lack of confidence. This can be built up to a very considerable degree in the young and inexperienced teacher who is quaking in the presence of difficulties. She can be taught how to obtain quickly the quality of confidence by asking her to perform certain tasks which will develop confidence. Many of us are working at about fifty percent of our efficiency, at a time when we could be using seventy-five or ninety percent if this quality were properly developed.

The best method of curing defects of personality is "training on the job." Through personal interview with older instructors, who have developed these qualities in themselves, methods can be obtained. The experience of the head of the department will yield methods and these can be given to the young instructor in the form in which they will be most efficient.

In summarizing this discussion, I may state that there are at least five plans which may be followed in improving methods of college teaching. Formal courses with undergraduate or graduate credit may be given, intensive course may be provided, once a week a seminar may be held for as long as is necessary, visits to classes may be made for the purpose of praising and improving the quality of instruction and direct training may be given in the development of the personality of the instructor. The possibilities are great and the technique is not difficult. Time for giving this instruction may seem to be difficult to find but it is of so much importance that time must be found, either by the head of the department or by some other member of the faculty who has unusual ability in this direction. Since the chief business of a college is to teach students, no pains can wisely be spared in making the teaching as efficient as possible.

#### DISCUSSION OF DEAN CHARTERS' ADDRESS

C. C. LITTLE, President University of Maine. This plan as outlined gives to the young instructor training in methods and would avoid all possibility of friction within a faculty in the case of supersensitiveness on the part of those who did not care to be told just how to do it. In the process of getting information they would become absorbed and you would have a test in the ability they showed in analyzing the material they are working with. I should like to ask Dean Charters whether there is any value in a fairly complete shift in the viewpoint as regards educational methods. It has always seemed to me that teachers were especially interested in methods of "spouting" information at scholars and very little interested in studying the would be absorbents. It seems to me that it is going to be desirable, as you work out methods to encourage the most detailed and painstaking study of the scholars; in other words, of the types of scholars who are causing this very disturbance that Dean Charters speaks about. As the conditions of admission to your university change and the types of student population shift, the information you have as regards your difficulties and the treatment of the situation purely on the basis of reforming the teachers as teachers will be out of date, whereas, if you are continually studying the students who present themselves for instruction, and have developed a method by which the information that you obtain in that way is recorded and placed in a position for analysis by the department of educa-

tion, then it seems to me you have made the first step in a system which will keep your information up-to-date. As the type of students changes the situation will change and the method of education will adjust itself to the changed material with which you have to work. This applies not alone to home economics. I have been interested in hearing many talk about methods and in all cases the interest has been how to change the teacher, how to improve his or her methods of delivering information. Now it seems to me that the whole situation might be approached very logically from the point of view of what type of individual is causing the trouble and on what may you look for help, not only in the business of distributing information, but of actually getting it absorbed. This would be a self-perpetuating method, because it is a barometer which will enable you to feel out the success of your teaching method.

MISS FLORA ROSE. We outlined a score-card for securing the teachers' judgment of the students, based on various personal characteristics. At the same time we decided that if it were a good thing for the teachers to judge the students it might be a good thing for the students to give their ideas of the characteristics of the instructors. It was finally agreed to use a similar plan for this purpose. The problem of making out a score-card for scoring the pupils' judgment of the teachers was turned over to the student council. It seems a fair thing to do.

#### COMMITTEE ON METHODS OF IMPROVING COLLEGE TEACHING IN HOME ECONOMICS

The following committee was appointed: Chairman, Louise Stanley of Ohio; Margaret S. Fedde of Nebraska; Frances R. Freeman of Maine; Wylle B. McNeal of Minnesota; Gladys A. Branegan of Montana.

Miss Margaret S. Fedde, University of Nebraska, presented the following paper:

#### MEASURING THE SUCCESS OF COLLEGE TEACHING

BY MARGARET S. FEDDE

For many years superintendents and principals have had rather definite concepts of the qualifications essential in the successful grade teacher. More recently, the high school teachers have been studying the problem and still more recently college professors and instructors have recognized the fact that they too must produce good teaching results. It is essential that the colleges recognize this responsibility because of their influence not only, upon the educational world but upon the business, social and religious worlds as well. While this discussion is intended to relate directly to the success of college teaching in home economics, it is necessary to make clear that the same principles apply to any college teaching; there is no real distinction between good college teaching in home economics and that in any other subject.

We, who are called upon frequently to answer the question—What is the measure of successful college teaching include the following points:

(1) Good teachers always have very definite objectives for the course as a whole, as well as for every lesson presented.



The good teacher will analyze her work and study carefully the needs of her students; she will base her selection of subject matter and her method of presentation upon their needs. She will study their objectives, what their responsibilities will be after leaving school and fit her instruction accordingly. If she finds that the majority of her students are desirous of becoming teachers in the smaller high schools of the State, then she must know something of the home and community life in those towns. If the student desires to go into business, then the instructor should know about the conditions in business which the girl will meet a little later on. If she desires to go into a home of her own, then the instructor should be able to prepare her for these responsibilities. But, in order that the instructor may meet the needs of these students in her teaching, it is necessary that she have as much experience in the various phases of work as possible. True, no one person may have vocational experience in all of these directions, but she should have experience in the thing which she is teaching if she would be really proficient.

Our whole curriculum and our various courses of study must be fitted to the needs of the student, and not the student to the course of study. In industry we fit the machine to the product, and not the product to the machine. The cotton grower does not grow cotton to fit the machine. However, when the cotton gin was invented to fit the cotton, there was a tremendous increase in the production of cotton. Perhaps when we fit our educational machine more nearly to the product we too shall see some startling results.

(2) Our teaching methods must achieve our aims.

We in home economics have erred in teaching abstractly, but more in teaching the process rather than the principle, and as a result our students are not as independent in their skills and in their thinking, as they should be. Our home management houses have large possibilities for correlating the principle with practice. Here opportunity is afforded the students not only to obtain some skill but to study and improve methods in meal preparation, child care and general home management.

(3) There should be close correlation and unification of work.

We now require a number of courses as prerequisites, but do we always see that the two are closely tied together? The time of our students is too valuable to spend it in repetition as we so often find it; for example, is it necessary to teach digestion in five different courses as we know has happened in the past?

(4) Student participation in the lesson.

Much of our college teaching is still done by the lecture method, whereby the teacher does all the organizing of material and thinking and the student is more or less passive until the "pouring back" or examination occurs. It stands to reason that our best thinking should come from our college trained students, but how can we accomplish this unless we are constantly stimulating thought in every lesson? The project method of teaching and the home projects carried on in the vacation periods in many schools in home economics, are excellent methods of motivation and thought provocation. The student needs to be motivated to do the piece of work not for the grade or credit he will make but for the interest in and appreciation of the work.

(5) The college instructor should be well qualified for her work.

In the first place, I presume most college instructors are chosen on the following basis of qualifications: (1) A solid foundation in subject matter, (2) agreeable personality, and (3) satisfactory record in or promise of teaching ability, or of research work. Once in the system it may be necessary to encourage better teaching—especially is this true in home economics where we often are obliged to take young instructors.

In order to establish standards for judging the effectiveness of teaching, it is desirable that we devise some plan of evaluating the instructor's work. Unless some scheme be devised for evaluating her work it will be difficult to measure the accomplishment of the work in the department, or there is no check upon those who fall below standards or who fail to meet the needs of the students.

The fundamental principle of an evaluation system is the directing of instructors into better service. If it is to be really helpful its chief element must be self-improvement through self-criticism and self-rating; it should be both inspirational and instructive. To be really successful, the evaluation scheme must not be an administrative scheme superimposed from above, but must be agreeable to both the instructors and the administrative officers. The instructors may rate themselves in terms of excellent, good, medium, and poor or by some other system understood by all.

Following is a list of qualifications and abilities essential in successful instruction. They are given in detail in order that there may be no misunderstanding as to terminology.

#### Personal and Social Attributes.

##### (1) Physical.

- (a) Appearance. Am I neatly, cleanly, becomingly, tastefully and appropriately dressed?
- (b) Voice. Is my voice efficient and agreeable as to rate and distinctness of enunciation and as to modulation?
- (c) Vigor. Have I good health and do I practice health habits? Have I buoyancy, and enthusiasm, wholesomeness? Have I physical, mental, and spiritual vigor?
- (d) Freedom from defects that injure.

##### (2) Personality.

- (a) Character. Am I kind, sympathetic, cheerful, optimistic, unselfish, sincere, discreet, open-minded, just, loyal, moral? Have I a sense of humor?
- (b) Leadership and initiative. Am I resourceful? Am I successful in securing loyalty and cooperation, in developing self-direction and self-control? Am I able to arouse individual and group initiative and effort?
- (c) Poise. Do I possess dignity, grace of posture, manner, and movement? Do I possess self-control and self-confidence?
- (d) Refinement. Is it based on kindness of disposition?

##### (3) Social

- (a) Ability to meet people. Am I at ease with them? Can I bring out the best in them? Have I the ability to size up people?
- (b) Effectiveness of speech. Am I able to express myself in an interesting and forceful way?

#### Professional Attributes.

##### (1) Scholarship and intellect.

- (a) General. Have I breadth and accuracy of information? Have I judgment of relative values? Am I clear and logical in my

- thinking and am I able to reach sound conclusions? Can I make prompt decisions? Do I express myself accurately, fluently and with no grammatical errors or colloquialisms?
- (b) Technical. Have I ample knowledge of, skill and keen interest in, the special work that I am teaching? Have I had sufficient vocational experience in my work to give me a knowledge and an appreciation of the needs of this work? Am I alert for new advances? Have I an appreciation of the functional viewpoint? Have I the ability to see this subject taught in relation to other courses and to the whole home-making program? Do I have high standards in the skills and accomplishments of the laboratory work?
- (c) Professional. Do I have a knowledge of the present educational theories and practices? Am I able to apply psychological and pedagogical principles to my methods?
- (d) Research. Have I the ability to select, execute and publish a piece of worthwhile research?
- (2) Instructional ability.
- (a) Method.
- Selection and organization of subject matter. Am I able to plan a course that has definite aims and that is suited to the needs of my students? Does the course have sequence and is there correlation with other work?
- Presentation. Am I able to present the subject in a way as to stimulate real thinking on the part of my students? Am I able to make the work interesting and related to problems in life? Do I bring out the relationship between this work and required allied work? Is my class work a success from the standpoint of definiteness and conclusiveness? Is my time used to the best advantage with an avoidance of waste in time and effort? Do I exclude all irrelevant materials and processes?
- Motivation. Am I using the students' experience in inducing study, thought, practice and enthusiasm for work in hand? Am I able to make my work really inspirational? Am I able to develop the service or functional aspects of my subjects? Am I able to advise or guide students vocationally?
- Assignment. Is my assignment carefully planned and clearly given? Is adequate attention paid to habit formation? Are assignments checked up afterwards?
- (b) Results or student responses.
- Efficient functioning of habits and skills. Are my students developing efficient habits and skills as shown by personal appearance, health and work habits? Is all of their work in good form and are they habitually prompt? Are they practicing good housekeeping standards? Are they independent in their laboratory work?
- Command of subject matter. Have my students the ability to recall, use and apply knowledge gained? Do they have good lesson preparation? Are they able to interpret work? Can they express themselves clearly, with precision and conciseness and grammatical correctness in good voice modulation and posture?
- Thinking ability. Can my students recall and interpret significant facts and ideas? Are they able to select those facts that are relevant to a conclusion and reject those that are irrelevant? Are they independent in organizing material? Can they reason logically?
- Initiative and impelling ideals. Do the students conduct themselves in a way that points to the functioning of ideals of industry, thoroughness, and fairness? Do the majority of students show evidences of the spirit of inquiry? Have

they a breadth of vision of the work? Are they able to concentrate or organize their work? Do they use economical methods of work?

(3) Cooperation.

- (a) With school officials. Have I a genuine interest in my own work and in the department and college as a whole? Am I always prompt in giving reports—are they always accurate? Am I willing to accept criticism or suggestions and do I profit by them? Am I responsive to extra-curricular demands? Am I loyal to the rules and policies of the department and college and to all faculty members when among students?
- (b) With colleagues. Am I able to work with my colleagues with due regard to professional ethics and business courtesy? Am I able to forget personal differences?
- (c) With community. Am I able to participate with the religious, social, educational, and recreational interests of the community?
- (d) With students. Am I able to get the students' point of view? Am I able and willing to direct and lead in approved student activities?
- (e) With professional organizations. Do I promote and cooperate with the American Home Economics Association, and other professional organizations? Do I read and support *The Journal of Home Economics* and other professional periodicals? Do I add to my professional library each year? Do I radiate joy in my profession?

Classroom Management.

- (1) Discipline. Am I able to discipline my students when necessary?
- (2) Room.
  - (a) Attractiveness and orderliness. Do I make my room attractive and homelike? Are my classroom and office orderly at all times?
  - (b) Hygiene. Do I see that the heating, ventilation, and lighting conditions are always good?
- (3) Equipment and supplies. Do I have adequate equipment, is it efficiently arranged and is it kept in good condition?

Measuring or rating the success of college teaching is a difficult problem because of the human element that enters in and because no adequate method or methods of measuring it have been devised. Attaching weights to the various points given on a score-card has not been found satisfactory. It may be of interest here to quote the opinion of 400 superintendents who were asked to give their opinion on the relative importance of various qualities desirable in teachers. The result of this inquiry (by Dr. Bagley) gave the following in their order of importance: (1) Address, (2) personal appearance, (3) optimism, (4) reserve, (5) enthusiasm, (6) fairness, (7) sincerity, (8) sympathy, (9) vitality, (10) scholarship.

I am confident that this order of importance would not hold for college teachers. Scholarship would probably stand first, then personality and teaching ability. I am sure we would agree that these three are most important. There are, however, other means by which we may discover the success of college teaching. Some of these are: (1) The relative number of students who have been stimulated to independent, conscientious, mental effort as shown by their quality of work while in school and their eagerness to select electives of related subject matter; (2) by the number of women who have sustained their interest and activity after graduation; (3) by checking rather closely on graduates the first year or

two they are out of college and interpreting the facts found in relation to their training; and (4) by the relative number of successful women after graduation, as shown by their success in the professional or business world or as successful mothers and home-makers and community leaders.

The methods by which we may measure the success of college teaching without the necessity of waiting for reactions from the alumnae will perhaps vary in every college; some administrators keep in close touch with the instructors, others have frequent group conferences when various teaching problems are discussed, while others cooperate with and utilize the professional training departments. Whatever method seems best suited to the college should be used if we would insure continuous growth on the part of instructors.

The following report was read in the absence of the chairman of the committee, Miss Emma Wardell, University of Illinois:

#### REPORT OF COMMITTEE ON QUALIFICATIONS FOR TEACHERS OF GRADUATE COURSES

Since the committee was unaware of its own existence until only a few weeks ago, we believe that it was unwise to attempt to collect sufficient data for a comprehensive report and for that reason wish to submit merely the following preliminary report:

In connection with our discussion of the subject we wish to recall the recommendation of the Research Committee of the American Home Economics Association, made February 28, 1922, and approved by the council March 1, 1922. This recommendation says in part:

"The research committee recommends that the association endorse the following qualifications as essential in those college faculty members who assume charge of, or responsibility for research work prosecuted by home economics students.

"Graduate courses and research work equivalent to that required for a doctor's degree, if this be possible and practicable to secure. Otherwise one or two years of graduate work in some graduate school of recognized standing should be insisted upon and evidence should be presented of the successful prosecution of original investigation in the form of written or published reports of such investigation. This evidence should be such as to be satisfactory to the dean or faculty committee of the graduate school concerning the fitness of the candidate for directing research work."

This committee recognizes the fact that not only do the qualifications required of teachers of graduate courses vary in different institutions, but so also do the qualifications required of candidates for advanced degrees and that if we set an arbitrary standard of qualifications for teachers of graduate courses we shall have to face the very practical question, Are there suitable and available candidates in sufficient numbers to go around? If not, what can be done about it?

In order to obtain definite information as to the situation in our colleges and universities at the present time the committee suggests that during the next year a survey be made by the committee to determine (1) the qualifications required of teachers of graduate courses in home economics and (2) the requirement for a master's degree in home economics and in related subjects, with emphasis on the minimum amount of research required for such a degree.

The committee also recommends that it be increased by three new members and suggests the names of Dr. Amy Daniels, Dr. Ruth O'Brien, and Dr. Helen Thompson.

EMMA WARDELL,  
MINNA C. DENTON,  
*Committee.*

WEDNESDAY MORNING, NOVEMBER 22, 1922.

Miss Martha Van Rensselaer, New York State College of Agriculture, presided at this session, which was devoted to home economics extension.

Discussion of local leadership in project work was led by Miss Marie Sayles, Ohio State University, as follows:

#### LOCAL LEADERSHIP IN PROJECT WORK

BY MARIE SAYLES

In opening this discussion it seems advisable to explain that two types of leaders will be mentioned, a township leader and a local leader. A township or community leader is one who has been selected by some township or community group that has been making a study of their program. Such a leader selected either by the chairman or by members of the group themselves, would then have the backing of the group and would also have a sense of responsibility for developing the program. The second type of leader is called in many States "a local leader." Such a person is selected by this township or community leader to be responsible for a certain restricted area. For example, in junior extension work the leader is responsible for a local club group of ten or twelve children or in an adult project in a definite district.

With those two types of leaders in mind I wish to discuss the value of such work and how it has been promoted. One of the most difficult questions that arises is how to secure leaders.

In developing an extension program we must keep in mind one or two very definite qualities that we are interested in having in that leader in order to promote the work to the best advantage.

The first objection that has been raised in practically every State is that certain projects can not be carried by a person who has not had the technical training that is necessary for teachers, or others who have been selected to carry on a very definitely planned program. It seems to us at the present time that this difficulty arises from the fact that we have not selected a unit of instruction that is small enough or simple enough to be carried by the local or township leader without extended technical training. So the main object of all our work in the extension field today is to eliminate and simplify every type of project, to select out of that certain definite units which can be given to a group for them to pass on to others.

In the extension program, then, we have those two things to consider, the development of subject matter in such a way that it can be passed on and the development and training of the leaders. There must be carried on in any community considerable work previous to program meeting where such leaders are to be selected so that the extension agents may decide whether

there is available leadership. This means that certain projects should not be undertaken unless we are sure that there are people in that community with possibilities of leadership along this line.

In a community meeting the first person that is usually suggested by the group, if they are discussing a certain piece of work, whether it is a poultry project, nutrition project or clothing project, is someone who is very skillful in that particular line. Very often in clothing it is someone who has had special training, perhaps who may have had training for dressmaking; someone in poultry who has had some commercial experience. We have found in the last three years that such leadership is not the type that will give us the best results. I am not sure that this decision is final. We may find ways of developing such leaders so that they may contribute to the extension program. The type that has been most effective in the groups which we have trained is the one who has had a feeling of responsibility for development of the program. She is the leader who naturally fits in to a program, is willing to give time and effort and has the qualities of inspiring people to do a real piece of work. Outstanding qualities of real leadership are the ability to inspire others to work and an interest in the community program. These qualities usually are discussed in the program meeting so that if there is such a person in the neighborhood she will be selected. It is far more effective if the agents or committee who are helping to plan the program have made it possible for such leaders to be present.

The next step is the training of leaders. At this time we probably are not ready to state what is the minimum or maximum amount of training that will be found to be essential for the development of this program. As a minimum amount we know there certainly must be one training meeting in the organization of the work. We find that it is necessary to train them in organization methods as well as in subject matter. They must understand how they are to secure their local leaders who are to be definitely responsible for various phases of the work, and to secure help of others in the promotion of that program so that very definite results may be obtained.

It may be possible as we develop projects to select some small units of subject matter that can be given to leaders where they are trained in methods. I refer to such simple projects as making of fireless cookers. If they have the methods of organizing and passing that information on, the method of collecting results, and planning, of exhibits or tours in their own community for the further spread of that information, we may have a working project that will secure results.

When we step over into projects which are more difficult to handle as far as subject matter is concerned, then the number of training meetings will have to be increased. The time required depends entirely upon the type of subject matter, which will vary with the project. In the nutrition field at this time we are faced with a responsibility to simplify the unit of instruction; to select some one fact that is fundamental. A method which we have devised to assist us in keeping accurate account of the development of the work is what we call the "follow-up meeting" or "check-up meeting." Some months after the leaders have been trained in any project and the work is in progress, they are called together in a county-wide meeting, to which all the people who have been carrying on the work

are invited. The attendance at these meetings has varied from 25 to 150. Either the home agent, or the specialist is present. This is an opportunity to review the subject matter which has been given in the project. As much material as possible is brought to illustrate the work. There is an opportunity given for anyone who has had contact with a piece of work to check up on their own methods and every one receives the inspiration which comes from meeting a county-wide group. This plan has aided very materially in keeping the subject matter correct and the leaders have gone home eager to see that the practice was spread. After all that is the true test of the project, whether it is of value and whether the farm homes are using that practice as a part of their everyday life.

In the further development of extension work we need to consider very carefully, how many leaders are needed in any given program year by year; and whether we can expect continued service from leaders who have been trained and whether we will be able to place any limit upon the number of leaders that one agent or specialist may successfully train. Another point which must be considered in addition to the subject-matter program, is whether there will be sufficient leaders developed by the plan which we are using. We must not create a feeling among the people that there is only a certain limited group that can be developed, and that we use these people to the exclusion of all others. Our aim must be to develop interest in all the people so that the outstanding ones can be gradually trained year by year to participate in their program. The length of service in the community is rather important. Some of our agricultural specialists feel that a leader once selected and trained in an agricultural project should continue that work five years or more. I am not sure that this is the best thing for the community. It may be a very fine opportunity for the leader from the standpoint of his own development, but it certainly is not going to increase the number of leaders, nor increase the size of the program.

One of the points it is wise to consider in regard to leaders is this; that the problem of leadership involves not only extending an extension program, but it also means that we have given the opportunity to a certain group of people for self-expression, for developing a sense of responsibility for themselves, which will plan better organization of the rural group. We need to increase the feeling of responsibility of the whole organization for a program in each county and this can be done in no finer way, at the present time, than through the use of leadership. It is far harder to train a group of leaders to teach someone else than it is to do it yourself, and that means a change in the type of educational work that we will eventually have to give to extension workers. The development of a supervisory program will have to be included in our extension methods and that is the thing that it seems to me we ought to consider at this time, because most of us, in order to increase the effectiveness of extension work, realize we will have to develop it on the leadership basis. If that is true we will have to help the agent in a plan whereby she will do this work more effectively. We are doing that in our training schools which we conduct at universities and those which we will conduct as we go out on supervisory visits to agents in the field, but we must have more definitely in mind to give assistance to those agents in showing them how to conduct training schools



for local leaders and township leaders, as well as to give actual instruction themselves when they are called upon to give such instruction to a group.

#### DISCUSSION OF MISS SAYLES' PAPER

MISS LUCILE W. REYNOLDS of Massachusetts. We just started this fall to put the clothing work on the leadership basis, holding training conferences for leaders, who were very responsive. We have also started nutrition work on that basis in a few counties. Before we start any of this work, or proceed very far, we must have very definite plans, both as to subject matter and method, and everything must be very carefully worked out so that there will be no doubt in the minds of the people as to what we are about.

MISS JULIET LITA BANE of Illinois. We have been really doing this with clothing for five years, I should say. I think we probably started at the point of least resistance, because I think clothing lends itself to this method most easily. We have had more difficulty, I should say, with food than anything else. We have tried to train our leaders as carefully as possible, but find we have to be very careful because they get wrong impressions. We have done some things with household management which I think have been very successful. We have to start by determining the things the leaders can do, and the things which the home advisors are to do. There are some things which lend themselves quite well to the work. For instance, with the dress form, home labor-saving devices, and some of those things that involve skill, we find the women can do very well, but with those projects that involve the giving of information, we have found we have to go very cautiously. We used to give a volume of things and now the specialist emphasizes one or two things near the time when the leaders are to hold their meetings.

THE CHAIRMAN. What are the possibilities of the local leaders being trained to make use of the trained people who might be in a community?

MISS SAYLES. We have found that one who has been trained in some other group, through another process, for instance in a technical course in dressmaking, often comes with ideas on certain processes so imbedded that they do not adopt readily a more simple method, and are lacking in the essential quality of leadership.

MISS EDNA E. WALLS of Iowa. Iowa has been working along the line of organized projects, using training school methods and local leaders, and the opinion among the workers in the extension department is that it has been successful. In nutrition there have been 137 local leaders, food utilization 202, home management 250, house furnishing 517, health 121, club work 495.

MISS SAYLES. We feel that the development of the program has not yet reached the stage where there could be trained one county-wide leader in project work. We have, therefore, used the plan of having a leader from each township or community who would meet in a group and carry the work back. In 23 counties where we were training leaders last year, a record of attendance was kept to see how many were interested. In five

meetings, one month apart, the lowest attendance was 90 percent, the highest ran up to 99 percent of the number of leaders present at every training meeting.

The leaders, as a rule, pay their own expenses, there being only one county in the State that has paid the expenses from the township to the county seat. I think we are going to lose in leadership qualities if the question of remuneration enters.

Under this plan the county home demonstration agent trains the leaders and helps the leader in each community to make reports to the general township meeting. She has general supervision of the work, but does not meet with the local groups. Her work is entirely with the local leader unless the work is not progressing in a satisfactory way. Then she goes out to learn the cause of the trouble and to strengthen the work.

We have been interested in watching the continuity of the work through the distribution of mimeographed and pattern material. We had last year about 3,359 women at work under 415 leaders trained in the clothing project and all of them completed the project. Evidently the local leader who has been trained in county meetings was effective in holding the interest and keeping the people at work.

Mrs. JANE S. McKIMMON of North Carolina. I believe that the women get a better knowledge of food and of clothing by having a trained woman go to them once a month for say five or ten lessons, and then have their local leader, who can not be as well trained, give the next lesson. The trained leader can follow up and see if anything has not been done, that should have been done. We are trying to find out what can be given to those communities which are not ready for local leadership, to satisfy them and bring them up to the local leadership idea.

THE CHAIRMAN. What is the duty of the State leader in this matter? General supervision of all projects and the correlation of them with other organizations, and the like. What has the specialist to do with the local leader idea? First, discussion of needs in relation to the project with the agent and county women. I wish to emphasize here that where there are misunderstandings it is because the specialist has not had time to stay and explain fully to the county agent. Second, the organization of the State for the development of the project. Third, cooperation with other organizations. The specialist must organize her subject matter for the year, and know where the second, third and fourth lesson is to be, or she will be lost. Fourth, teaching the leaders subject matter and methods of securing widespread results. Fifth, summary and analysis of results.

What has the home demonstration agent or county agent to do? She organizes the county and continues development of the projects. She studies the needs of home-makers, and then leaves out those communities which are not ready. She teaches the local leaders. That presupposes much consultation on her part, and much training. She supervises the work of the leaders, and if the work of the specialist or State leader becomes too great she secures and summarizes reports of the work.

We have paid a great deal of attention to the question of reports, because unless we have some means of knowing what work has been done we lose our grasp upon the situation, we do not know what to do next. The local leader does for the community what the agent does for the

county. Someone has suggested that the nutrition project was more difficult to carry out than the clothing project. I confess to a good deal of doubt whether at the very start we should have local leadership in nutrition. But I have made up my mind nutrition can be taught.

#### LOCAL LEADERSHIP IN THE NUTRITION PROJECT

MISS FLORA M. THURSTON, New York State College of Agriculture. The nutrition project was organized on the same basis that the clothing project was organized. I think we have to keep clearly in mind, first of all, that local leadership is not a method of teaching, but a method of project organization and, therefore, local leadership is a method of extension, and can be used in any project in so far as you can organize subject matter and develop leadership successfully in that project.

As Miss Van Rensselaer has said, we were rather afraid there was danger in promoting a nutrition project through local leadership, because we felt that the nutrition work was very technical, and the subject matter was not available readily to local people, as it had been organized in bulletins, college courses, etc. We felt that it was possible to instill some of principles of nutrition and to teach these with practices which we felt needed to be taken up by the people, and in that way we could be very sure that there was little danger of anyone going wrong in nutrition. As a result we have found that people have changed practices in a wonderful way, and that they have improved in health. The first year we taught practices which were good and then gave some of the principles involved in those practices. Our second year people were extremely eager to know about why certain practices were good, and so this year we are teaching more principles than we did last year, and next year will probably teach more.

We have records to show that over 2,000 people actually changed in habits last year, and that over 800 of those who changed got very definite results. We get our records by having a system of reporting from the local leaders to the Bureau. We expect every local leader to find out how many people in the community actually make changes, what changes they make, and what results they get.

The practice we asked them to follow were to eat more vegetables and more fruit, and to drink more milk, or take it in some form and also to emphasize the whole cereals. We found at first practically no one was eating whole cereal bread, but from reports received at the end of the project, we found that 75 percent of them were then eating whole wheat bread. We asked them not to take an excessive amount of meat or sweets; not to eat sweets between meals, to drink plenty of water, and not to drink an excessive amount of tea and coffee. In addition we gave special attention to overweight and undernutrition and constipation. By using the score-card we found out first what people were eating and then knew what to emphasize. Then we found out what ailments they had and that gave another clue to the type of nutrition work they needed. The second year work we are doing now I would never have chosen sitting at my office. It grew out of the reaction from last year's work.

In the first year's work following the score-card, we discussed a classification of foods on the basis of sources, such as fruits, animal foods, roots, etc. Then we took up meal planning, school lunches, community dinners, and the relation of nutrition to family garden, how one could and should affect the other. The counties we had last year are still taking this work and the total number of counties is greatly increased. We require each group to have the first year before they take the second year. Our first and second years take about five meetings each.

**QUESTION.** Would you think a year too long a time to carry on a single project so as to have a continuous program?

**MISS THURSTON.** I don't think it too long if the people want it. The people in New York State are not as active in work in summer as winter. They prefer to begin in October and close in April, so we plan to have our project run during that period and have five meetings on the subject matter and then six meetings with the leaders, which is an advisory council meeting, a summary of the work during the year, and discussion of plans for the coming year.

**QUESTION.** Is there a county-wide meeting at any time at which all the members who have taken work in nutrition are present and to which other people, who have perhaps not seen the value of it are invited?

**MISS THURSTON.** We do not have a county-wide meeting because we can't get all the people to come in as large numbers as we like to. We have district meetings which we call rallies.

**QUESTION.** How much value do your agents think there is in such a meeting, in getting actual practices improved on the part of those other people who have not been definitely involved?

**MISS THURSTON.** I think we get more publicity and more public opinion created than anything else. We don't expect to start practices. The main object of a rally is to tell people about nutrition.

**QUESTION.** We have 32 counties organized with home demonstration agents, and have three subject-matter specialists in nutrition. I would like to know how you would go to work to make those three specialists cover those 32 counties.

**MISS THURSTON.** We meet the county leaders in groups; for instance, I have one district in the State where I met seven county leaders at the meeting where we train local leaders. That is, we demonstrate with these local leaders to the county leaders how the work should be done, and that is one way of economizing our time. We reach seven counties in one day and then those leaders go back and reach all their local leaders.

**QUESTION.** At these meeting do you have a demonstration group?

**MISS THURSTON.** We always have a demonstration group of local leaders. For instance, this district I mention is in the center of the county. The leaders of that county and the leaders from adjoining counties all come in.

THE CHAIRMAN. Who pays their expenses?

MISS THURSTON. The expenses of the county leader are paid by the county and the local leader by the local people.

QUESTION. Are those leaders someone the county has appointed?

MISS THURSTON. In this particular case they are.

QUESTION. Does that fit in with the general program of the home demonstration work? For instance, if there is a class of nutrition in one community, is that all they do? Does the local leader take charge of everything else?

MISS THURSTON. No. The chairman of the community group takes charge, is responsible for all the project work that is carried on.

QUESTION. I am wondering where you get all those leaders in a community.

MISS THURSTON. It is hard to get enough leaders, but at present in many communities we have a chairman, treasurer and secretary, and two leaders in nutrition, and two leaders in clothing, and they, in most cases, are all different people. We sometimes have recreation teachers in that same community, or may have leaders from school.

MRS. MCKIMMON. I wonder whether these State agents have visited their State boards of health and arranged for their specialists to be the health specialist to go out and work with the home demonstration agent. For instance, in our own State the secretary of the board of health has arranged to have these things given through our home demonstration clubs, and I wonder if that would not be a very good way in lieu of not having your own health specialist.

MISS SUSIE V. POWELL of Mississippi. We find that the State department of health is eager and anxious to cooperate with us and meet us more than half way, and we are using two of their women physicians in that capacity. We thus save the little money we have for specialists in other subjects. We find that we get much better results than we would if they got the idea we were trying to do the health work. They realize a specialist in nutrition could do things they can not.

I think in this discussion we have probably overlooked the fact that many of our county agents have had very excellent training in nutrition, as well as some other subjects, and that, in that event, the State specialist can very easily give them the supervision and let them carry out this project with only a minimum amount of her time spent in the county. It is our practice to put the greatest part of the State specialist's time in counties where the agent has not had that particular training or in counties where we have no agent at all, and we find we get excellent results in that way.

MISS THURSTON. Is the nutrition work as it is done in most States combined with the food preparation, or do you consider food preparation a part of nutrition?

MISS POWELL. You outlined our work so well for us that I would not even attempt to change it. We have been doing almost exactly what you outlined. We have only one nutrition specialist. She gives her plan to the agents at their annual, group, and district meetings, and then when the agents need very special attention she goes and gives them help. Some of them are able to take what she gives them and carry out the program and need very little supervision.

MISS THURSTON. In New York State we have separated the food preparation and preservation from nutrition, and we feel we get a stronger program.

MISS POWELL. If we could have a number of specialists we might do that. We have a food preservation specialist and a nutrition specialist, and their work is closely combined.

#### HOUSEHOLD MANAGEMENT

THE CHAIRMAN. To what extent have we developed household management projects?

MRS. M. C. BELL of Maryland. We have really not done very much in that work. I can only tell you results in one county in which the work has been carried on since June. The county home demonstration agent there had a number of meetings in which she had talked and worked on household management. Then she began to talk to the women about local leadership and what their responsibility would be. She then asked them whether they wanted to carry out the household management work with local leaders. She had 13 clubs in her county well organized. Eleven of them selected household management. We have had four meetings in that particular county, and I really feel from the returns that both the women and men are interested. I started with a very simple project and tried to make it very clear to the leaders how to present the work to their groups.

MISS LUCILE W. REYNOLDS of Massachusetts. We have done something along this line, starting with demonstration groups in counties. We have not done it on a local leader basis. We have the services of a woman for a few months in the year. Last year this specialist carried on demonstration groups in a few counties just to show what could be done. We started in a very simple way, with kitchen equipment, arrangement, and processes. We have constant demand from all over the State for more work in that field. We find that the second year there is interest in water systems, expenditures and other things involving money which would not have been thought of in the first year. We had a home management conference with agents from different counties, at which we discussed subject matter in home management. At that meeting we had engineers meet with us and give subject matter to the agents in this line, and we feel that was very much worth while.

MRS. M. M. DAVIS of Virginia. We have just begun doing what we call kitchen improvement work. I think it is going to cover the whole State finally, because requests have already come from many counties for this work. Our home economics specialist in foods worked out a kitchen

score-card to be used in this work, with a simple form for reporting results. That was all we had to start the work with except some mimeographed suggestions for a convenient kitchen which we used at the State fair the preceding year. The home demonstration agent and I made the rounds and scored kitchens. As a result of our work at the end of the three months we had a get-together day in one county and then two prizes were offered. The merchants gave them to us. The prizes were a four-burner stove and a kitchen cabinet and the woman who made the greatest improvement in her kitchen at the least outlay of money was to have the choice of those prizes. We had told them that anything they could get free they need not charge themselves with, and any work they could get done for them was not counted against them, only to charge up the actual money they spent. Of five of the kitchens entered in this contest four have water in the kitchens and three have bathrooms.

As a result of that work another county decided to have a kitchen contest. They decided they would work in the summer. When I tell you that one home was that of the superintendent of a railway and one of a mountaineer you will have some idea of the kind of people we worked with, and we had just about as good results one case as in the other.

MISS HELEN W. ATWATER of the United States Department of Agriculture. In about 400 farm homes data were collected regarding household equipment, and these were divided into tenant and owner families, and my very strong impression is that the difference between these as regards kitchen improvement is very much less than we expected it to be. A great deal more is done by the tenant than you would expect.

THE CHAIRMAN. At a recent meeting of our county agents and extension workers we discussed the question of introducing into our household management project this year the making of the budget, helping housewives to divide their income, and the statement was made that because farm incomes are so different from others, this would be difficult to do. We would recommend that all county agents and extension workers keep personal accounts, and, if possible, household accounts. If we are to teach others to keep accounts and to budget their incomes we should first do it ourselves.

#### RELATION BETWEEN EXTENSION WORK AND RESEARCH

C. F. LANGWORTHY, United States Department of Agriculture. Many important things have been suggested by what has been said here this morning.

I would like to say first that the subject matter with which home economics workers have to deal varies widely in kind and importance. For example, such things as involve breaches of etiquette or mistakes in the selection of clothing touch mainly our pride or our pocketbooks and are far less vital than failure to correct faulty diet or give proper instruction in child welfare work, which may do not only grave immediate harm but may impair the health of coming generations.

There are many suggestions on which good, sound advice can be given without taking the problem involved to the research laboratory. I have great respect for and belief in the value of traditional knowledge or that which comes from experience. For a long time, at any rate, we will have

to depend to a large extent on that sort of knowledge, but we should test it and add to it by every means at the disposal of the trained laboratory worker.

I doubt whether we are justified in limiting our use of the term research narrowly to such studies only as are made by the aid of the exact sciences such as physics, chemistry, and mathematics. To do this would eliminate from research much of the work that is done in history, archeology, and other fields. I think that the field worker in home economics who uses as exact methods as are available in collecting information for the purpose of drawing logical conclusions from it without seeking to establish any preconceived notion can properly be considered a contributor to research. For example, I think that the study of the effectiveness of methods of presenting subject matter reported by the department of home economics of the New York State College of Agriculture is worthy to be called research.

The ease with which people can be persuaded to follow our lead makes us all realize that we must take unusual precaution to teach only the things that we feel assured are sound. Moreover, it is highly desirable to take the public into our confidence to the extent of making it clear that we would change our teaching tomorrow if we should learn that we are wrong.

We must be careful to distinguish between general principles and their practical application. In child welfare work, for example, I would take pains to present the work in such a way that the group with which I was dealing would realize that we are making special application of more general principles and that the subject of dietetics does not begin and end with what we are teaching.

The application of the results of research usually lags far behind the work itself. It is, therefore, a pleasure to reach a point in research work where enough evidence has been accumulated to settle a question and to have prompt practical use made of the findings. The question of the height of working surfaces, to which someone has referred, is a case in point. We have been able to show by experiments with the respiration calorimeter that there is a distinct extra expenditure of energy if the working surfaces are too low or too high to "fit" the worker, and to demonstrate the heights requiring the least expenditure of energy. The results have been promptly made use of not only by housekeepers but by furniture manufacturers.

Generally speaking, we have found a great deal of sympathy with and support for the study of problems of food and nutrition. We have not found as ready a response to pleas for funds to be used for the development of research methods and for special apparatus essential to the study of many problems of clothing, household equipment, and household management. It is comparatively easy to organize experiments for studying the tensile strength of cotton or wool, but a satisfactory study of the wearing quality of goods made from these and other fibers presents many difficulties and is bound to be costly. If you want work of this kind done in the Department of Agriculture or elsewhere you will have to arouse popular interest and show that it is of great importance, not only because of the close connection of the work with such matters as the selection, care, and use of clothing in the home, but also because of its close relation to important economic questions of production, distribution, and use of



agricultural products; and for these products the home is the "ultimate consumer."

It is possible to bring together a large amount of useful information available in laboratory reports and elsewhere and present it in forms suitable for use in popular instruction and for other purposes. However, whatever else is done, research work must go on and be enlarged if home economics is to develop as it should.

Finally, in considering the development of home economics we must not overlook the great importance of economics, for this is the foundation on which home economics rests.

THE CHAIRMAN. I think Dr. Langworthy has expressed the obligation which we have as extension workers to support any effort that might be made for research in our Department of Agriculture. He has done just what I had hoped he would do, and that is to fix the responsibility. We are in the field, we are working with those persons who have problems to be solved. We should bring pressure to bear from the field for a solution of problems. We can not go on with a piece of extension work and make it an educational matter unless we are constantly getting something more to extend. We should get the real problems from the field. Those working in research will know whether these problems are worthy of consideration and if we do send in problems which are not possible for them to solve for us for lack of equipment, or people perhaps, we can help to get this assistance.

#### HOME ECONOMICS COURSES FOR EXTENSION WORKERS

GRACE E. FRYSENGER, United States Department of Agriculture. The subject of training for extension work might well be considered from the standpoint of four distinct groups: (1) Those who are about to undertake a four-year course of study, terminating in a degree and including home economics training, with the definite purpose of becoming extension agents; (2) those who are already taking such a course and who have determined upon extension teaching as a vocational outlet for their training; (3) those who have had four or more years of college training, including home economics, and who are returning for advanced work as special preparation for extension teaching; (4) home demonstration agents already in service.

##### THE UNDERGRADUATE

For the undergraduate, the summary of the study made by the committee on extension training of the American Home Economics Association<sup>1</sup> is as follows:

I. (a) That the first two years of training be no different from that of all home economics students, and that these years be utilized to train in the fundamental development, including science, literature, etc., and a minimum of technical courses, these being largely of a manipulative character.

(b) That the decision as to specialization be made at the end of the sophomore year or that such decision be made following a course on the scope of the field of home economics and that particular effort be made to explain to home economics students this newer and less understood field of home economics education.

<sup>1</sup> See Jour. Home Econ., Sept., 1922.

(c) That the advanced two years be utilized for those courses which will broaden the horizon and social viewpoint of the student, and which would require more mature judgment and experience—such courses should include economics, sociology, philosophy, etc. This period should also be used for courses in which the student may apply the basic principles studied in the earlier years in terms of the chosen field of activity.

II. That sufficient interest has been manifested in such agricultural courses as bee raising, dairy, poultry, horticulture, etc., as to suggest that a survey course in agriculture would be a highly desirable course for all home economics students who may possibly find their field of endeavor in extension work or for those doing resident teaching in the smaller towns and consolidated rural schools.

III. We urge that a definite effort be made to give all undergraduates a thorough appreciation of the field of extension teaching through courses in education and vocational guidance conferences.

IV. We believe that every prospective agent should have actual field experience and that same should be of approximately four to six weeks' duration, one week at State headquarters gaining general knowledge of State conditions, personnel policies and available help, and, five to six weeks as assistant agent in a county having a successful home demonstration agent whose county conditions are fairly similar to the county where there is a likelihood the assistant agent may be located.

Additional recommendations of the committee are as follows:

I. We recommend the very great need of certain types of information which may generally be classified as "service courses." We recommend that such courses be taken subsequently to the four year course rather than during that time, which we believe should be devoted to general development and technical courses.

II. Since much of the work in extension is done directly with adults, we urge that courses in education be broadened to include consideration of the method of teaching the adult mind.

#### THE GRADUATE ABOUT TO ENTER EXTENSION SERVICE

- (1) Knowledge of State conditions.
- (2) Knowledge of county conditions.
  - (a) Educational.
  - (b) Social.
  - (c) Economic.
  - (d) Available cooperative agencies.
- (3) History of extension education.
- (4) Present extension policies.
  - (a) Organization.
  - (b) Demonstration.
  - (c) Relationships.
- (5) Present status and plans for extension work of State.
  - (a) Subject matter adapted to extension needs.
  - (b) Methods of teaching.
  - (c) Methods of organization.
- (6) Knowledge of resident subject matter departments which may contribute to the extension program.
- (7) Knowledge of research work under way.

## AGENTS IN SERVICE

- I. A. Training to keep up-to-date.
  - (a) Subject matter
  - (b) Methods.
- B. Suggestions—Special training in subject matter and methods in connection with annual conferences.
  - (a) Based on past experience of needs.
  - (b) Based on special needs of future.
- II. A. Training to meet conditions for which agent has no training.
  - (a) Poultry, dairy, millinery.
- B. Suggestions—
  - (a) Handle at convenient times—no special time of year.
- III. A. Training to meet special needs of emergencies.
 

Examples—

  - (a) Milk from tuberculous cows.
  - (b) Surplus of product.
- IV. A. Training to meet future needs.
 

Example—

  - (a) Cooperative sale of by-products.
- V. A. Purpose—To meet individual need of agent.
  - (a) Office management.
  - (b) Use of records.
  - (c) Care of automobile.

## GRADUATES RETURNING FOR ADVANCED WORK IN PREPARATION FOR EXTENSION SERVICE

Recommendations for advanced courses are in process of preparation by the committee for presentation at the August meeting of the American Home Economics Association.

MISS LOUISE STANLEY. We have offered for several years a course in extension methods and practice teaching in the extension field. It has been rather difficult for me, as head of the department, to get girls into that course. If they could foresee going directly from graduation to an extension job, it would be different, but our extension division has asked that all the girls do two years' teaching before they go into the extension work. In other words, they want us to use the teaching field as preparation for extension work. I have objected to this and proposed that the girls get their preliminary experience on extension jobs under supervision. I believe you are going to find that younger girls who are carefully selected and given definite training in the work before they really go into extension service, are going to have as high percentage of success as some of these who have gone out through the teaching field.

MISS FLORA ROSE of New York. We have sent out a great many girls direct from the department into the field as apprentices to other agents and the counties want those girls now as agents as against the others who have had greater experience. They compare favorably with those of greater experience, if the personality in the first place is just as good.

**MISS FRYSINGER.** Those who are particularly interested in getting good classroom instruction feel that the classroom instructor should not be used for practice training in extension work. I am wondering if there is not the occasional teacher in the classroom who would find extension work more interesting and would like to enter it. More than that I believe that every year we are finding a larger group of women, who have taken general academic training and have been teaching a few years, who want to come back into a specialized field of activity. Those people with their more mature years, broader touch with life, and experience in a general teaching field, coming back to take up special work in home economics, seem to me to have a large opportunity for service in the extension field.

**Mrs. M. M. DAVIS** of Virginia. It seems to me that we must go much further back than the training. If we want a home demonstration agent we must get the right material to make one out of. My State is an agricultural state and a home demonstration agent can not succeed there unless she has a rural background. I would prefer a young woman who knows rural conditions, who has been brought up on a farm, who knows how to keep house from practical experience at home, who has the right attitude of mind toward life—a good, upright, honorable, Christian young woman who has had this experience and two or three years of successful experience in teaching—who loves to work with people and wants a broader field than a classroom. I will take such a young woman without one particle of home economics training, I will put her out in a county with a good experienced woman who has had many successful years as a home demonstration agent and sometimes I will keep her there six months. I have several now doing excellent work who have worked with home demonstration agents. Ninety-nine times out of a hundred a young woman of that character will make good in my State, whereas a young woman who may have had four years of home economics training and in addition to that has her master's degree with all sorts of college training, but absolutely no rural background on which to place this training, will make a failure. Don't understand me to say I am opposed to training. I am not. Take a young woman with this background and then give her the training and I will tell you things are going to happen in your counties.

**MISS JULIET LITA BANE** of Illinois. It seems to me that the amount of training that we require for extension work and the amount of experience that the agent needs depends just a little on how much supervision is given in the county, because if they are closely supervised we can use less experienced people. We have felt that our home advisors have needed assistance with office management. We have been able to help them through the use of a specialist in office organization.

**T. B. SYMONS** of Maryland. I feel that the problem that you have been discussing is fundamental for the success and welfare of home economics work in the country. If there is anything we need it is well trained, mature women to carry the message that is so necessary for the rehabilitation of homes in rural sections. I am wondering if it would not be possible for this section to consider in the future and, in fact, the Home Economics Association to consider, whether we could agree generally that approximately four or five leading institutions of the country make it their business to

erect a college of extension, which would provide graduate work and provide special instruction for county agents and for those county specialists in extension activities that would desire to improve themselves and advance their work. I am sure that each State will have to have extension courses to meet the needs that have been pointed out for undergraduate workers. I believe a study of personality of the students by the officials of the colleges of agriculture would be well worth while, so as to point out to them if they have possibilities of making a success in extension work. I believe if we could center our efforts in four or five institutions in the country we might be able to meet the needs for graduate work.

**MISS FRYSDINGER.** Two years ago in the Extension Section of the American Home Economics Association just such a suggestion was made by the committee on extension training, and in pursuance of that recommendation the committee was continued and requested to recommend undergraduate study for extension workers in home economics. This year the committee was asked to continue its work and to recommend a graduate course.

#### COMMITTEE ON EXTENSION WORK

Miss Marie Sayles of Ohio was appointed chairman of this committee with power to appoint four other members.

WEDNESDAY AFTERNOON, NOVEMBER 22, 1922

The meeting was called to order by the chairman of the section, who introduced as chairman of the afternoon session, Dr. C. F. Langworthy of the United States Department of Agriculture.

Dr. Langworthy introduced Dr. E. D. Ball, Director of Scientific Work of the Department, who discussed the plans for the proposed Bureau of Home Economics in the department, as follows:

#### THE PLAN FOR THE BUREAU OF HOME ECONOMICS

BY E. D. BALL

The first thing the Department of Agriculture has to do in the organization of a Bureau of Home Economics is to get that organization approved by Congress, and the bill recommending it is now before the Committee of the House for consideration. If that change is approved, then the next step, as we see it, is to gather together a committee representing the very best thought on the subject of home economics and related lines of work that we can gather here in America. We shall want to ask that committee to consider two things: The first will be a program of work for a home economics bureau. This will need to be considered from a number of different angles. First, what would be a typical organization, the best organization—a program to work to, if you please, for the future. This must be a program of research work, because the work of the Department of Agriculture must in the future, even more than in the past, be organized along research lines. Second, from the angle of the situation that they find in the Department of Agriculture and the possibilities of developing some parts of this work within the organization that we now have. In home economics, the office that we have functioning at the present time has been

built up in association with an extension department and you can naturally and readily understand that under such circumstances there would be a considerable emphasis on the furnishing of material for extension work. Sometimes we are a little too impatient to wait for research and so we gather our material in other ways. But I feel, and I think this is the feeling of the Secretary, and everyone in the Department, that now is the time to very materially strengthen the research work in all department activities and especially in home economics and probably transfer a considerable amount of the extension work that has been in the department to the States.

It is the intention of the Department of Agriculture to entirely divorce itself from extension work through the bureaus and arrange for this extension work through the extension department and that means through your State agencies. I do not mean to say that we do not intend to do extension work, but that we will do extension work through the organized State agency.

The second function of that committee, the hardest one and at the same time the most important, is to recommend candidates for the leadership in this work.

We have been discussing questions of research in agriculture and in engineering, and that discussion centered very largely around the fact that you do not get the research unless you have the individual. So the first primary function in determining on a research program is to select the individual who will be able to direct and inspire the work. That is the hard problem. As I think I told you last year, I still feel that research, which must be organized to serve a comprehensive home economics program, will come in part from other bureaus and other departments; that if we undertake to organize a home economics bureau that would correspond in its service to the service of the department to agriculture, it would of necessity be made up of a large number of independent bureaus, almost as many as the present Department of Agriculture, because practically every one of the fundamental sciences contributes to home economics development. Therefore, in the final development of a home economics bureau in the Department of Agriculture it seems very likely that it will be an organization in which in addition to its own work there will be carried on cooperation with a number of other bureaus.

We must think of the home economics work as serving a field almost as big as the field of the agricultural department, and as a work that is entitled, when it is ready to take its own, to the recognition that the service to agriculture has received.

I feel confident that this bureau will be created by Congress. I see no reason why it should not. There has been the criticism—a just one—that there has been no outline of just exactly what we intended to do. That is the function of this committee. They should undertake to work out a big, broad, national program that we can work to, and then adapt that to the situation and finances that we have with which to start the work.

We have asked at this time for no major increase in the funds for that work. We will be able to transfer work and reorganize work so that there will probably be funds to begin whatever we feel is necessary. Once the work is begun and the right people are there to present it intelligently we

should have relatively small difficulty in securing the finances to take care of it.

Time was when the salaries in the Department of Agriculture were comparable with those paid in the better class of universities in this country. The reason they are not today is not because there is anything fundamentally wrong with government methods, but it has been largely the fact that no one has made it his business to thoroughly acquaint the authorities with the situation. I feel sure that the present condition is now appreciated and that remedies will be forthcoming in a short time; that such service to the National Government will receive recognition equal to that of similar services in the States, and that we will be in a position to ask for and obtain national leadership in these lines of work.

My duty as Director of Scientific Work is to try and coordinate the work of the Department of Agriculture, the work of the different bureaus of the department, and the work of those bureaus with the work in the States, and if home economics work is going to develop in this country in any such scale and proportion as it should, to keep the place to which it is entitled, it must qualify as a great, active, cooperative organization in which practically every State has its obligation. It is for you as representatives of the home economics departments in the States, to see to it that you are in position, when the time comes for the Federal bureau to establish a broad, cooperative research program, to take your share of the burden. You must be ready.

Dr. Helen B. Thompson, Kansas State Agricultural College, submitted the report of the committee on research, as follows:

#### REPORT OF COMMITTEE ON STANDARDS OF RESEARCH

Your committee suggests the following fields of research as fundamental to home economics subject matter.

(1) Chemistry and physics of food preparation and preservation (experimental cookery).

(2) Chemistry and physics of textiles.

(3) Microbiological studies of food preparation and preservation.

(4) Nutrition.

(5) Hygiene, personal and household.

(6) Mechanics of household equipment.

(7) Economics of the household and of other institutions, including efficiency studies in administration.

(8) Home economics education in schools, colleges, agricultural extension service, etc.

(9) Child care and management in the home.

We recommend that continuous effort be made to develop research workers and methods in all of these fields, and that care be taken in every instance to measure up to the standards already set in those fields in which research is well established, as for example in nutrition and in chemistry of foods or textiles. We urge the necessity of exact methods of work and rigorous self-criticism in the less completely developed fields (5 to 9 above).

We desire particularly to call the attention of investigators in the chemistry and physics of food preparation to the need of exact specifica-

tions of the nature of the materials used, as well as of weights, temperatures, and methods of manipulation. For example, it is not sufficient to list flour as an ingredient; it should be specified as milled from certain wheats in a certain way and by the manner in which it responds to certain chemical and physical tests.

We recommend the limitation of the use of the term "research" to studies which contribute to the advancement of learning by the discovery of new truth or of new application of truth. We suggest the use of such terms as "surveys" or "investigation" for publication of results of questionnaires answered by correspondence or other compilations of opinions. We consider that the survey constitutes real research only when truly scientific methods are used. We fully recognize the value of surveys not founded upon first-hand knowledge, when used as a preliminary means of discovering conditions and revealing opportunities for research. We feel, however, that the word research has been inadvisably applied to many such "surveys." We would, therefore, distinguish carefully between studies in economics, education, and extension which deal with records and facts secured at first hand by the investigator and those which compile opinions and generalizations on facts already known.

We recommend further, that the *Journal of Home Economics* be requested to publish at suitable intervals an authoritative list including the titles of all investigations which could properly be classed as home economics research, i. e., as coming from home economics departments and as being worthy of the name research, together with brief abstracts of these papers, when published in other journals.

We recommend the initiation of an organized effort to get expert editorial opinion in all of these nine fields of work as the means of developing standards. To this end, we recommend that the Journal Board and the Research Committee of the American Home Economics Association be asked to so organize their advisory committees that pass on unpublished material as to include specialists of recognized standing in each of the fields embraced within the scope of home economics as outlined above. That is to say, we suggest that the fields not already fully represented, such as microbiological studies in food preparation, mechanics of household equipment, economics, and child care and management, be given adequate representation on the advisory committee agreed upon by the Journal Board and the Research Committee. In any case in which there is no available home economics woman to represent the field adequately we would urge the appointment of a suitable woman or man from a field of related science as a member of this advisory committee.

Respectfully submitted,

HELEN B. THOMPSON,  
MINNA C. DENTON,  
MARTHA VAN RENSSLAER,  
*Committee.*

On motion, the report was adopted.



## HOME ECONOMICS RESEARCH IN ENGLAND

C. F. LANGWORTHY. Not all may be familiar with the research of the kind done in England, particularly that connected with war problems, when the Government made very generous grants for this purpose. In some cases the research was along lines studied in the Department of Agriculture, and in some cases along lines carried out at the Bureau of Standards. As yet, a full report of this work in Great Britain has not been published, but preliminary reports are available. One of these is a report on the pandemic of influenza, 1918-19, which seems to say something a little bit different about the responsibility of the home and consequently of those who study home problems towards public welfare. To quote from this report:

"One thing appears to be reasonably certain, and that is that until a universal improvement in the standard of comfort and the conditions of life is secured, there will be no prospect of effectively mitigating the incidence of this deadly complaint. Other diseases have been brought under control; influenza still eludes us. The conclusion to which we are led is that the generation of a great pestilence such as influenza or pneumonic plague is dependent upon disturbance of social order involving for absolutely large numbers of human beings, the endurance of conditions of insalubrity which afford for invading parasites a suitable field of modification."

One often finds in papers of this sort hints of things or suggestions for thought that we would not expect to happen upon from such a source. During a recent visit abroad Miss Atwater learned of various lines of investigation of interest to home economics. Work on clothing, household equipment, and household labor, which has not received in America the attention which it merits and which is, in fact, regarded very skeptically, has been recognized as of decided importance in Great Britain. It was included in the research studies organized during the war, and under different auspices. For instance, in the study of the science of ventilation and open-air treatment carried on under the auspices of the Medical Research Council. The chemical purity of the atmosphere in crowded and confined places was studied. In this the debilitating effect of sedentary work in the warm and stagnant air of offices, shops and factories was emphasized. There was a chapter dealing with the thermo-permeability, protective, and hygroscopic properties of various clothing materials, with the heat evolved by dry clothing materials in taking up moisture from the skin. Measurements of the heat-retaining properties of clothing materials was set forth, and clothing suitable for the Tropics was considered.

The report also dealt with general methods of ventilation and heating treated from a physiological point of view. Artificial systems of ventilation were compared with respect to the advantages of radiation of energy from open fires and gas fires together with cool air. Ventilation of railway cars, schools, and public buildings and of tropical houses came under review. Though undertaken from the medical standpoint the methods and results are both applicable to other conditions.

The work of the Housing Committee is extensive and systematic. In this, Great Britain went much farther than would seem possible in the United States, for houses were actually built by the government for rent to tenants. The work has included studies of building sites, of building

materials, and building methods and of the stress and strain which different building materials endure; tests of the efficiency of different fuels for cooking, for domestic heating, and other equally homely problems, as well as those which are more complex. The necessities of wartime showed that exact information was essential in these great questions of economics, health, well-being, and comfort in the home and out of it, wherever men carry on their daily tasks.

In matters of food and nutrition, Great Britain followed the United States, but it seems equally fair to say that in these other subjects which pertain to home economics, Great Britain has pointed out more clearly than has been realized here that they merit attention under government auspices. It is sometimes felt, or perhaps said, that in contrast to the work with food, practically no attention has been paid by the government or by other students of nutrition to the problems of clothing and shelter and household equipment.

A persistent demand for any article usually determines the supply, and there can be no doubt but that the demand in the past has been very much greater for information on food—its selection, preparation, and so on, than it has been for information on the other home economics topics. When the demand is made for work on clothing, textiles, and household equipment, and made forcibly enough, the work will be done.

Another matter in favor of food investigation is that this generation of investigators at least started with well-established methods. Much pioneer work must be done in the case of work in textiles and clothing, for existing methods are relatively few and the development of methods is costly. A rough estimate which I obtained showed that some \$10,000 had been required for the development of an accelerated-wear machine, for a particular article of clothing, and at best the instrument will give relative rather than absolute results, for it has so far proved very difficult to include in a machine the various elements attendant on the wear of clothing by the human body.

All are familiar with the work done at the Bureau of Standards, which was given up because of the lack of a worker trained in it. Part of this work, in so far as it pertained to home economics, was brought together, not in sufficient amount for publication, but enough to be valuable and it is available for consultation. It was brought together by Miss Ruth O'Brien of Iowa State Agricultural College in the time, less than a month, in which she was connected with the Office of Home Economics.

The adaptation of the respiration calorimeter to the study of household tasks has made it possible to carry on such work as that, of a very profitable nature, to any extent for which funds would be provided, and those who give the matter any thought may rest assured that home economics specialists in the Department of Agriculture would welcome the opportunity for the extended research studies upon clothing, textiles, and other home economics matters which have been planned and which have fallen by the wayside somewhere between the investigators who made the plans and those who make possible the expenditure of public funds.

The following paper was presented by Miss Mary L. Matthews, Purdue University:

## RESEARCH IN HOME ECONOMICS

BY MARY L. MATTHEWS

When I was assigned to discuss this subject I felt that it was necessary to send out questionnaires to the land-grant colleges and others doing research work. As the questionnaires were returned I was struck forcibly with the fact that very little has been done along research lines by the departments of home economics, in spite of the fact that we all agree this work is vitally necessary.

There are probably four reasons why little research work has been done:

(1) We have been busy outlining and standardizing our courses in home economics and only within recent years has there been time to consider research work in most of the land-grant colleges.

(2) We have been groping around trying to determine the best method of attack on research in home economics. The field is enormous. At present a large percent of the colleges say that they are doing "experimental work" or "investigation work" but no "formal research." Perhaps we shall have to agree on just what the term "research in home economics" means.

(3) We have had few women adequately trained or probably I might say sufficiently interested in doing good work of this type or who were willing to spend the time needed to develop such work.

(4) The most important influence against the work has been lack of funds with which to carry on research in home economics.

But my talk has to do, not with the reasons why such work is not being done, but with provisions now made for such work.

The questionnaire which many of you generously answered, was sent out to 50 colleges and 32 answers were received. Some of these were received too late to be included in the tables appended (pp. 351-353).

The first question was, "Do you carry on research work in home economics?" Sixteen colleges out of the 32 answered "Yes," 16 out of the 32 said, "No." Of those not listed in the first table (p. 351), the following reported work: University of Illinois, University of Chicago, and Iowa State College. Six universities reported that the departments were not well established and that they were not "old enough" to do research work.

The second question was, "Is there someone on the staff devoting full time to this work?" Only three answered, "Yes." These were Colorado Agricultural College, Cornell University, and Purdue University. The work is reported as being done by the instructional staff.

Question 4 was, "When work is done by the instructional staff, how is time in the schedule of work arranged?" Two universities reported that every member of the instructional staff was expected to do some research work, namely, the University of California and University of Chicago. Dr. Morgan in her report said, "Proper research experience and training before hand, required of all members of the staff, is the one essential for the development of research. Many home economics departments are made up in such a way as to make research, worthy of the name, *impossible*." We can not all agree with Dr. Morgan. Most of us would prefer to agree with Miss Ruth O'Brien, who said in a recent issue of *Journal of Home Home Economics*, "Why expect or demand that every instructor direct or

carry on research? It is congenial and profitable only when she has at least three qualifications: (1) She must have previous training in the general methods of research and experience in studying a problem herself; (2) she must be well read and must have the time, or more important still, the inclination to keep herself up-to-date in her field; (3) there is perhaps such a thing as a research type of mind and it might be well to inquire whether your investigator possesses such."

Question 5 was, "What provisions are made for members of the staff to have leaves of absence for further study?" There were almost as many answers as there were colleges reporting. Some reported leaves of absence without pay at any time by special arrangement. Others reported leaves of absence earned by teaching summer terms. When salaries of any sort were paid, they were given to the assistant professor or those ranking above. In some cases assistants and instructors are given time in the schedule to do graduate work. Kentucky reported that they have sabbatical leave, with full pay, if they teach in three summer schools without pay. Further reports relative to this question are given in the table on page 352.

Question 6 was, "Do you maintain a graduate department?" and question 7 was "If not, are graduate courses in home economics offered?" The answers to these questions are given in the table on page 353. Those colleges reporting having graduate schools not in the table are the University of Illinois, University of Chicago, and Iowa State College which has a graduate and research department in the school of home economics.

Those reporting graduate courses in home economics not listed in the table are University of Idaho and University of Kentucky. Courses seem to be developed mainly along experimental cookery, nutrition, and textile lines.

Question 8 was, "The number of graduate students in home economics at your institution this year?" States reporting graduate students in home economics this year, not included on the table were: Iowa State College, summer quarter 31, fall quarter 19, University of Illinois 1, University of Chicago 36, University of Idaho 1, University of Kentucky 2, making a total of 16 universities out of the 32 reporting students in graduate courses in home economics.

Question 9 was, "How are students encouraged to do graduate work?" The answers to this question are listed in the table on page 353, except in the cases of Iowa State College, which answered as follows: (1) Endeavor to build up strong graduate courses, (2) information concerning demands for well trained people given them, (3) four fellowships now available for well qualified students, (4) publicity material sent to those in the State likely to be interested. University of Chicago reported "an atmosphere of research in the whole university. The offering of graduate courses and advanced courses containing both graduates and advanced undergraduates."

Question 10 was, "Are any experiment station funds devoted to research in home economics?" Only two answered, "Yes" to this question, namely, Colorado Agricultural College and Purdue University.

Question 11 was "If not, from what source is financial aid obtained?" The replies to this question are listed in the table on p. 351. The funds were mainly secured from the regular home economics budget.

The twelfth question was one asking for further information relative to research in home economics. In many of the answers to this question the statement was made that very little work was being done, but the departments felt that this work was vitally needed and they all hoped to organize for such work before a great length of time.

After reviewing the replies to the questionnaire it seems to me we have certain points to consider:

(1) That we all agree that more research in home economics is badly needed.

(2) That funds are needed for this work. Can we obtain them in the land-grant colleges through the experiment station or shall there be special legislation appropriating such funds?

(3) That we need to define the term "research in home economics" so that we may agree on what is meant. Should we not call experimental work and investigational work of a worth while type research in home economics?

(4) That we need more definite standards worked out and adopted for graduate work in home economics.

(5) That we need to develop courses suited to the training of research workers providing they have the "research type of mind."

(6) That the land-grant colleges have reached the point where they need to formulate a definite policy and plan for research in home economics—one that will not be talked about from year to year, but a plan under which we may begin work at once—a plan that in time will bring about more worth while research, that will stimulate a live, vital interest in the subject.

RESEARCH IN HOME ECONOMICS

Institution	Research conducted by the home economics staff			Source of funds	
	Number of full time teachers with title	Number of part-time staff doing part-time research	Arrangement of schedules for members of staff engaged in part-time research	Department stipend?	Other funds
Pennsylvania State College	1	Few	Teaching schedule made light	None	State funds
Ohio State University	0	None at present		None	
State College of Washington	0	0		None	
Colorado Agricultural College	1	0		Yes	
Montana State College	0	0		None	
North Dakota Agricultural College	0	0		None	
University of Wisconsin	0	2	(1) 80% research 20% instruction (2) Half-time instructor 100% research (3) 25% research 75% instruction		
University of California	0	All	Teaching schedule made light	None	General funds
University of Missouri	0	Some	Teaching schedule made light	None this year	Appropriation for scientific laboratories
University of Minnesota	0	Some	Some instructors on half-time do graduate work	None	Regular budget
Purdue University	1	0	One instructor outlines and checks work in nutrition	Yes	
Cornell University	Yes	Some doing investigation work	Time for necessary investigation in connection with teaching	None	Department maintenance fund. Last year a grant from National Research Council
Oregon Agricultural College	0	0		None	None
University of Kansas	0	4	From 1 $\frac{1}{2}$ to 1 $\frac{1}{4}$ of instructor's time is allowed for research	None	

PROVISIONS FOR LEAVE OF ABSENCE FOR HOME ECONOMICS STAFF FOR FURTHER  
STUDY

Institution	Sabbatical year with pay?	Sabbatical year without pay?	Miscellaneous
Pennsylvania State College	....	....	Faculty members given one-half or one year with various ar- rangements as to pay.
Ohio State University	....	....	Since the four quarter plan has been adopted, staff may accu- mulate vacation not to exceed three quarters.
State College of Washington	....	....	
Colorado Agricultural College	....	....	By special request.
Montana State College	Half pay for assistant pro- fessor and above	....	
North Dakota Agricultural College	....	....	Teachers on twelve months' basis may have one-half year on half pay at end of four years' continuous service.
University of Wisconsin	....	....	Teach three summer sessions, two without pay, then get one- half year leave.
University of California	Two-thirds pay for assist- ant professor and above		
University of Missouri	....	....	Teachers may earn a leave of absence by teaching in either spring or summer term.
University of Minnesota	Yes—on half pay		
Purdue University	....	....	Leave without pay.
Cornell University	To professors and assistant professors		
Kansas State Agricultural College	....	....	Leave on one-half salary granted to upper members of staff who have served several years. Leave granted to any member on request without pay.
Oregon Agricultural College	....	....	Leave without pay granted on request.
University of Kansas	....	....	None, on pay.

## GRADUATE WORK IN HOME ECONOMICS

Institution	Is there a graduate school in the institution?	Are graduate courses in home economics offered?	Number of graduate students in home economics this year?	Means used to encourage graduate work
Pennsylvania State College	Yes	Yes	2	"After this year fellowships will be offered."
Ohio State University	Yes	Yes	4	"No definite plan."
State College of Washington	Yes	Yes	0	
Colorado Agricultural College	No	No	0	
Montana State College	No	Yes—in summer school	0	
North Dakota Agricultural College	No	No	0	
University of Wisconsin	..	Yes	12	Graduate fellowships; scholarship open to graduate students.
University of California	Yes	Yes	25	"Use of experimental method in undergraduate courses and by daily observation of faculty members carrying on their own research."
University of Missouri	Yes	Yes	9	"It seems the natural course for them to take." A large share of our students take some graduate courses. I have listed only those enrolled for a degree.
University of Minnesota	Yes	Yes	5	
Purdue University	No	Yes	3	
Cornell University	..	Yes	2	"By conferences with students who are able to do graduate work."
Kansas State Agricultural College	Yes	Yes	11	"Juniors and seniors advised to choose electives in fields leading to graduate work. Seniors having time to accumulate excess credits urged to take excess in courses for graduate credit."
Oregon Agricultural College	..	Yes	2	Teaching fellowship.
University of Kansas	..	Yes	3	



The final paper of the session was presented by Miss Helen W. Atwater, United States Department of Agriculture:

#### THE PUBLICATION OF RESEARCH FINDINGS

BY HELEN W. ATWATER

A discussion of the publication of research findings naturally divides itself into answering the questions when, where, and how.

When one shall publish depends on the nature of the work, the purpose for which it was planned, and possibly on the policy of the institution paying the bills. Some research lends itself well to progress reports, dividing itself naturally into sections, each of which can be reported as soon as it is finished. In other cases, the question studied is such that all parts must be completed before any can wisely be published.

The question of where to publish also may be decided by the nature of the work and the policy of the organization supporting it. If the institution in which the work is done has its regular series of publications, these may be the obvious or necessary place for the report. If this is not the case, and if the work is not intended for publication in book form, then the investigator must choose to what periodical he will offer his material for publication. If the primary purpose of the investigation has been to furnish technical information of little immediate general interest, the strictly technical journal is usually the natural channel. If, on the other hand, the research was conducted primarily to make possible the immediate practical application of the information gathered, then the work must be presented where those who need it are likely to find it, that is in periodicals of more general or popular interest. Some of the professional periodicals occupy a sort of middle ground; they publish articles which are addressed to a rather broad professional group, and combine a somewhat summarized description of technical procedure and findings with a discussion of their practical application. Familiar examples of such periodicals are the *Journal of the American Medical Association* and our own *Journal of Home Economics*. Some of the trade papers also publish articles of this kind, and home economics workers might find these a desirable outlet for certain kinds of investigation in foods, textiles, and household equipment.

The place of publication will have much to do with the answer to the question of how, that is in what form, to publish. Certain matters of form, such as table headings and footnotes, are often determined by the regulations of individual journals or institutions. In many cases the editors will supply statements for the guidance of contributors. How much description of technique shall be included and in how great detail the findings shall be presented, will depend on the character of the audience to be reached. For technical readers one can allow oneself the use of more technical phrases than for a more general or more broadly professional public, but it is a generally accepted rule among careful technical writers to limit the use of technical terms and let ordinary words, in their ordinary meanings, do the work, whenever this does not lead to inaccuracy or circumlocution. The less technical the audience, the more one is justified in sacrificing the conciseness of technical phraseology for the ease in

understanding every-day expressions. This does not mean "writing down" or using only very short words, but merely bearing in mind that even the most intelligent general reader finds it easier to read a few extra words than to turn back for a technical definition. Another point on which careful writers, editors, and readers agree is that every article more than a few pages long should have a summary. We none of us can hope to go through everything published even in our own special lines, and we are much more likely to read the whole of an article, the main points of which are well and briefly summarized, than we are one which we can judge only by its title.

It might be expected that anyone competent to carry on research would, without question, report it in language that would be clear and accurate, with the statements logically arranged, but unfortunately this is not so. In going over the literature on this question of scientific writing or "serious writing" in general, it is surprising to find how unanimous are the critics and with what feeling they speak. George Henry Lewis, himself a scientist as well as a literary critic, says in his "Principles of Literary Success":

"A man will spare no labor in research, grudge all labor in style; a morning is cheerfully devoted to verifying a quotation by one who will not spare ten minutes to reconstruct a clumsy sentence; a reference is sought with ardor, an appropriate expression in lieu of the inexact phrase that just suggests itself does not seem worth while. What are we to say to a man who spends a quarter's income on a diamond pin which he sticks in a greasy cravat?"

More recently Sir Clifford Allbutt, the distinguished English physician, was sufficiently impressed with the low state of scientific writing to publish a book entitled "Notes on the Composition of Scientific Papers." In the introduction he tells that it is his constant duty to read theses presented by candidates for medical degrees. The use of thesis writing, he observes, is to train the mind or to prove that the mind has been trained; the former purpose, is, he trusts, promoted, the evidences of the latter are scanty and occasional.

In this connection it is interesting to recall the answers received to a questionnaire on the changes needed in engineering schools which was sent to 23,000 graduates of such schools a few years ago. There was great variety in the suggestions offered, but the majority of the men replying included the necessity of improved courses in English.

Herbert Spencer, in his "Philosophy of Style," finds that the underlying principle of the current rules of rhetoric and grammar is the economy of the reader's or hearer's attention.

"So to present ideas that they may be apprehended with the least possible mental effect is the desideration toward which most of the rules point. Regarding language as an apparatus of symbols for conveying thought, we may say that, as in a mechanical apparatus, the more simple and better arranged its parts the greater will be the effect produced. In either case whatever force is absorbed by the machine is deducted from the result."

Spencer also suggests that the chief requisites of an able writer are a sense of logical dependence, constructive ingenuity, a good verbal memory, and a sensitive ear. To a certain extent these are innate characteristics and it is undoubtedly true that the literary artist, like every other, is born,

not made. It is a long way, however, from the fine flower of art to decent craftsmanship, and there is nothing about the craft of writing which an educated person, competent to read a book on the principles of composition, can not acquire if he will. Surely a sense of logical dependence is as essential in conducting research as in writing; constructive ingenuity comes with practice; and reading and the dictionary do much to supplement a poor verbal memory. There is no lack of good handbooks on composition for a person conscious of inadequate knowledge of the craft of writing, nor is it a difficult matter to apply to one's own writing the principles they present. It takes time, to be sure, but ease comes with practice, and unless one is contented to reach only those who already know one's goods, one must always spend something on salesmanship. Moreover, it is a truism that the best writers are usually those who take time to improve and re-improve, polish, and re-polish. Anatole France probably possesses more than almost any writer of our times the power of expressing a profound truth in a simple sentence. Yet hear what he says in "Life and Letters":

"A simple style is like a white light. It is complex but not to outward seeming. In language a desirable simplicity is but an appearance and results only from the good order and sovereign economy of the various parts of speech."

If what Sir Clifford Allbutt says of his medical theses is equally true of many scientific papers in this country—and few, I think, will deny that it is—has not the teacher who guides the research of younger students some responsibility in the matter? Is it consistent to insist on accuracy, precision, and logical development in the search for truth, and then slur over the lack of these qualities in expressing that truth? And can readers be expected to feel that an investigator has been careful and orderly in securing his results if he is careless and disorderly in their presentation?

#### ELECTION OF OFFICERS

The following officers of the section were elected: Chairman, Miss Flora Rose, New York State College of Agriculture; secretary, Miss Stella Palmer, University of Arkansas.

#### COMMITTEE ON BUREAU OF HOME ECONOMICS

On motion, the following committee was appointed to study the needs of home economics and make recommendation to the Secretary of Agriculture regarding the development of a Bureau of Home Economics in the United States Department of Agriculture: Anna E. Richardson, Federal Board for Vocational Education, chairman; Ruth A. Wardall, University of Illinois; and Mary L. Matthews, Purdue University; the chairman being given power to appoint an additional member of the committee, if deemed desirable.

Adjourned.

## MINUTES OF THE EXECUTIVE BODY

WEDNESDAY, NOVEMBER 22, 1922

The Executive Body was called to order at 2 P. M. by President W. J. Kerr of Oregon, oldest past president of the association in time of service.

## AMENDMENTS TO THE CONSTITUTION

Action was taken on the proposed amendments to the constitution (Proceedings Thirty-fifth Convention, pp. 351-352) as set forth in the call for the thirty-sixth convention as follows:

I. *Sections.* Par. 1.

Present form: "The Executive Body of the Association shall consist of the presidents or executive officers of the institutions having membership in the Association. The Executive Body shall be the legislative branch of the Association."

Proposed form: "The Executive Body of the Association shall consist of the chief executive officer of each institution having membership in the Association, or a substitute duly appointed by him, and shall also include all members of the Executive Committee. The Executive Body shall be the legislative branch of the Association."

II. *Officers.* Par. 1.

Present form: "The officers of the Association shall consist of a president, vice-president, and secretary-treasurer, to be chosen by the Executive Body."

Proposed form: "The officers of the Association shall consist of a president, vice-president, and secretary-treasurer, to be chosen by the Executive Body and to serve as the officers of such body."

On motion, the amendments were unanimously adopted.

The pro tempore chairman called to the chair the acting president of the association, Dean A. A. Potter of Kansas. Seats were taken by the following: Deans A. R. Mann of New York and F. B. Mumford of Missouri, members of the Executive Committee; Dean J. L. Hills of Vermont, secretary-treasurer; Director C. B. Hutchison of California, Dean C. A. McCue of Delaware, Director W. R. Perkins of Louisiana, Dean O. M. Leland of Minnesota, Dean E. A. Burnett of Nebraska, Dean J. G. Lipman of New Jersey, Dean Alfred Vivian of Ohio, Dean J. W. Votey of Vermont, Dean E. C. Johnson of Washington, Dean H. L. Russell of Wisconsin.

## REPORT OF COMMITTEE ON COLLEGE ORGANIZATION AND POLICY

The report of the Committee on College Organization and Policy was read by the chairman, President C. A. Lory of the State Agricultural College of Colorado, as follows:

(1) In common with all agencies of government, the colleges are confronted with the necessity of scrutinizing every activity with a view to the full justification of all expenditures. The colleges dare not fail to make the most searching self-examinations, in an effort to accomplish the least expenditure commensurate with the important requirements of the work. While urging these considerations upon ourselves, we can not assert too strongly the serious danger to our whole educational structure if public appropriations are unwisely reduced. The colleges have never been fully

manned, their lines of work are permanent, the assembling of a staff of able teachers is a task of years, and the demands of research are continuous and unlimited. The severe, but relatively temporary, depression and the consequent decline in enrollment in some of the colleges of agriculture, must not be misinterpreted and seized upon as the occasion for reductions in available funds. It would be a State and a national disaster if painstaking and constructive work were to be sacrificed in this time of temporary emergency.

(2) We strongly commend land-grant colleges for the emphasis they are placing upon the training of men in agricultural economics and in furthering research studies in farm management, marketing, distribution, cost of production, grading, the use of trade-marks, etc. We urge that this policy be continued and the work strengthened to the end that comprehensive knowledge and well-trained men be available as the need for both develops.

(3) At the thirty-fifth annual convention of our association the following recommendation was adopted:

"That a definite policy for the improvement of elementary education for country children be adopted; that each land-grant institution cooperate with other State agencies and organizations in a program for rural school betterment and make surveys and special studies of rural school conditions and needs and of means for improvement; and that it cooperate with rural communities in their efforts to secure better educational advantages for their children." (Proceedings Thirty-fifth Convention, p. 345.)

In order that our association may know what is being done in each State to bring better educational opportunities to country children and how this work may be strengthened, it is requested that during the forthcoming year the Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts be requested to make a study of rural school betterment programs. Since instruction in agriculture, home economics, trades and industries under the National Vocational Educational Act fits into and naturally is a part of any State program for equalizing educational opportunities, it is requested that a study be made also of the status and development of this work by this committee.

(4) The institutions comprising our association may well look with satisfaction and appreciation on the progress shown in the development of engineering experiment stations. The policy of establishing such a station at each land-grant college giving instruction in mechanic arts is strongly recommended.

(5) In order that our association may have definite and authoritative information on the development of engineering and industrial extension service, it is recommended that the president of the association appoint a committee of five, of whom at least three are engineers, to study this development and report at the next annual convention.

(6) Vocational education established under the National Vocational Education Act is making most commendable progress.\* Our obligation as an association and as individual institutions to this work can best be met by strengthening our teacher-training courses. We believe it a mistaken policy to divide such teacher-training in agriculture, home economics and trades and industries among several institutions, as is now done in some States. From the standpoint of economy this can be better done at the land-grant

colleges, since they already have the technical staff and material equipment. From the standpoint of orientation and vocational outlook no other institutions have such close contact with industry, such sympathetic attitude, or as adequate facilities for training and cooperation in service.

C. A. LORY,  
W. M. JARDINE,  
R. D. HETTEL,  
W. M. RIGGS,  
A. R. MANN,  
*Committee.*

President Bizzell of Texas stated that the Federal Board for Vocational Education had established minimum requirements for teacher-training in agriculture, under date of May 22, 1922, for a "teacher-training institution in Texas," which, in his judgment, were inadequate. He, therefore, submitted a proposed statement to the Federal Board, which had been approved for such submission by the Committee on College Organization and Policy, as follows:

*To the Federal Board for Vocational Education:*

The Association of Land-Grant Colleges believes that the training of teachers of vocational agriculture as contemplated in the provisions of the Smith-Hughes Act is an important and specialized undertaking, demanding extensive and expert training and training facilities. It is imperative that such teacher be a successful scientific farmer, as well as a successful teacher of farming. No institution that is not adequate for training the farmers and agricultural leaders of the State is adequate to give proper agricultural training to the prospective teachers of vocational agriculture. This association heartily endorses the statement of the Federal Board of Vocational Education in its third annual report, defining the character of the institution that should train the teachers of vocational agriculture. This statement follows:

"The success of the training of teachers of agriculture is largely dependent upon the meeting of the following conditions, in so far as the character of the institution which is to do the training is concerned: (1) The teacher-training institution should be in touch with the latest developments in the field of scientific and practical agriculture, in so far as these developments relate directly to the agriculture of the State. This means that the institution should have the facilities for and be engaged in agricultural research and experimentation; (2) the teacher-training institution should give the instruction in classes in technical agriculture from the standpoint of the use of the results of this instruction in the field of practical agriculture. This means that the institution should have the facilities for and be engaged in the teaching of agriculture as a vocation; (3) the equipment in the teacher-training institution should be the equal of any in the State, in so far as instructors, laboratories, farm machinery, farm buildings, farm animals, and other equipment, material and supplies needed for instruction in subject-matter of agriculture are concerned; (4) the teacher-training institution should be in constant touch with the farmers of the State in order that there may be direct contact with the condition and development of agriculture in the State. This means that the institution should be the center of agricultural activities in the State, in so far as they relate to service to farmers and to the best scientific principles and practice of agriculture."

Notwithstanding this statement of policy by the board in 1919, there was set up by the board on May 22, 1920, minimum standards for faculty

and equipment for a teacher-training institution in Texas (a copy of which is herewith attached), which standards in the judgment of this association are wholly inadequate and are making against the progress of vocational agriculture. This association, through its Executive Committee, requests that the Federal Board for Vocational Education reaffirm its statement of policy of 1919, and that, after September, 1923, no teacher-training institution continue to receive the approval of the board unless it can meet the four conditions mentioned above.

If for any reason the land-grant agricultural college in any State refuses or fails to train teachers of vocational agriculture in sufficient numbers to meet the demands of the State, and it seems desirable to establish another teacher-training institution, this association recommends that the board require this institution to compare favorably with the agricultural college of the State in regard to agricultural faculty and agricultural plant, including flocks and herds. It is hereby recommended that for such institution, the following be the minimum standards:

*Faculty.*—The institution shall maintain the following well-organized departments of agriculture, with one or more technically trained instructors in each: (1) Agronomy, (2) animal husbandry, (3) poultry, (4) dairying, (5) horticulture, (6) agricultural engineering, (7) farm management, (8) entomology, (9) agricultural chemistry, (10) rural economics and sociology, (11) agricultural education. In addition to the above there shall be an adequate teaching staff for giving English, biological and natural sciences, and economics.

*Livestock.*—(1) In beef cattle, hogs, sheep and dairy cattle, the commercial breeds of the State shall be represented in the institution by a purebred male and several purebred females of desirable type. There shall be maintained a sufficient number of individuals representing each commercial breed of the State to furnish a variety of classes for instructional purposes and a commercial unit for a farm enterprise in that State.

(2) Poultry. The commercial breeds of the State shall be represented in the institution by purebred flocks adequate for instructional purposes and for commercial units of not less than 100 birds for each commercial breed represented.

(3) Horses and mules. The institution shall own a good type stallion and mares of at least one breed of (a) draft horses, (b) light horses, and a span of good type draft mules.

*Land.*—The institution shall own and operate sufficient land to maintain the flocks and herds on a commercial basis.

*Farm Machinery.*—There shall be available in the institution farm machinery in sufficient quantity for class instruction, and representing all classes of farm machinery used in any part of the State.

*Buildings.*—The institution shall have buildings adequate for all the farm enterprises mentioned above and suitable to be recommended to farmers of the State for similar enterprises. In addition there shall be a creamery conducted on a commercial basis. Suitable houses and equipment shall be furnished for incubation and brooding of chicks on a commercial basis.

*Laboratory Equipment.*—Adequate provision for recitation and laboratory facilities for each of the departments mentioned above shall be provided to insure efficient instructional conditions. Standards of equipment for each department are to be determined by the content of the courses as

determined by the needs of the State. Adequate provision for giving supervised or practice teaching in vocational agriculture under normal conditions shall be furnished.

**MINIMUM EQUIPMENT FOR TEACHER-TRAINING INSTITUTIONS AS SET UP BY THE  
FEDERAL BOARD, MAY 22, 1920**

*Recommendations for Approval.*—(a) A technically trained man to give instruction in agronomy; (b) a technically trained man to give instruction in animal husbandry, poultry and dairying; (c) a technically trained man to give instruction in horticulture, including gardening and forestry; (d) a technically trained man to give instruction in rural engineering and who can also give courses in farm management; and (e) a qualified man to give courses in special methods in teaching vocational agriculture and to organize and supervise practice teaching.

**Land**

*Recommendations for Approval.*—Eighty-five acres of land which may be used for general farming and demonstration.

**Farm Machinery**

*Recommendations for Approval.*—Modern farm machinery as used in the best sections of the State of Texas, to operate a one hundred acre farm. This would include among other things, a corn binder, a disk harrow, a corn planter, grain drill, ensilage cutter and filler.

**Livestock**

*Recommendations for Approval.*—(a) Representatives of two different breeds of beef, together with a purebred male which will be the most representative of the demands of this section of the State; (b) representatives of two different breeds of sheep, together with a purebred male which will be the most representative of the demands of this section of the State; (c) the dairy herd should consist of at least eight milking cows and to include among these the Holstein breed as well as the Jersey. There will be at the head of this herd either a purebred Jersey or Holstein bull; (d) representatives of two different breeds of hogs, these to be purebred, and to be headed by a purebred male best adapted to that part of the State; (e) representatives of three different breeds of hens, there to be not less than a dozen of each breed; (f) one pair of mules and also two horses representing two different breeds.

**Buildings**

*Recommendations for Approval.*—(a) Modern dairy barn and silo; (b) piggery with pasture; (c) livestock barn to take care of beef cattle, sheep, horses, and mules; (d) poultry house with runs; (e) shed for storing farm machinery; and (f) attached to or in connection with the dairy barn should be a milk house, in which should be found a cream separator and some device for sterilizing milk vessels.

**Laboratory Equipment**

*Recommendations for Approval.*—The institution should provide recitation and laboratory facilities for each of the following fields: (a) Agronomy; (b) horticulture; (c) animal husbandry, including dairying, and poultry; and (d) rural engineering and farm shop work.

This makes four different rooms for laboratory and instruction work in the respective fields of agronomy; animal husbandry, including dairying and poultry; horticulture, and rural engineering, including farm shop work.

On motion, the statement presented by President Bizzell was referred to the incoming Executive Committee.



On motion, the report of the Committee on College Organization and Policy, having been amended by the direct submission to the incoming Executive Committee of the matter discussed in item 6, was accepted and adopted.

In discussion following the acceptance of the report, two matters were stressed:

(a) The inadequacy of present research work in the field of agricultural economics.

(b) The difficult situation created in several land-grant colleges by the system of centralized financial control which seems to be increasing in its scope. It was pointed out in this connection that the Committee on Education and Research of the National Research Council had been looking into the situation; that in several States the research function had been almost smothered; and that in at least one State a test case had been taken to the courts with a view of determining the legality of such control.

On motion, the incoming Executive Committee was asked, if practicable, to cause to be made a thorough study of the administrative relationships of the land-grant colleges with their respective State governments, in respect to centralized financial control, and to that end to cooperate with other agencies.

#### REPORT OF COMMITTEE ON MILITARY ORGANIZATION AND POLICY

The report of the Committee on Military Organization and Policy was read by the chairman, President W. B. Bizzell of the Agricultural and Mechanical College of Texas, as follows:

The Standing Committee on Military Organization and Policy, begs leave to submit the following report:

Your committee held one extended session in the office of Colonel Gleaves yesterday afternoon and a brief, informal session this morning. As a result of these conferences we recommend the following:

(1) That no entrance college credit be allowed for work done by students in military science in preparation for admission to college.

(2) That academic credit in military science presented from another institution for a degree be determined jointly by the administrative authorities and the professor of military science and tactics of each institution.

(3) That the number of junior Reserve Officers' Training Corps units in high school and other secondary schools, not essentially military, be not increased by the War Department; and that junior Reserve Officers' Training Corps units now established in high schools and other secondary schools, not essentially military, be placed, as soon as practicable, under provisions of Section 55c, National Defense Act.

(4) That the plan of holding regional Reserve Officers' Training Corps conferences be commended and that it is recommended that similar conferences be held annually in all corps areas.

(5) That the present system of determining distinguished colleges be modified, and that in future definite standards be formulated by the War Department, and all institutions shall be designated as distinguished colleges, irrespective of the number, that measure up to this standard, as determined by inspection by army officers in the corps area where the institutions are located. (Not adopted. See statement below.)

(6) That the War Department be urged to provide an adequate number of commissioned officers to conduct Reserve Officers' Training Corps work.

(7) That we oppose reduction in the number and grade of non-commissioned officers assigned to Reserve Officers' Training Corps units and that the Executive Committee of this association be requested to appear before appropriate committees of Congress and urge the passage of pending legislation that has for its object the retention of the number and grade of the present non-commissioned personnel of the army.

(8) That the Executive Committee be requested to urge upon Congress the need of more adequate support for Reserve Officers' Training Corps work; and that college executives are herewith requested to direct attention of their senators and representatives in Congress to this matter.

(9) That the War Department be requested to maintain Reserve Officers' Training Corps and Citizens' Military Training Camps on a separate basis.

(10) That attention is called to the fact that in appraising results of the Reserve Officers' Training Corps the number of reserve officers actually produced is not the total benefit that has been derived from public expenditures. Attention is called to the great number of students who do not complete the Reserve Officers' Training Corps course, but who represent the great by-product that is available, in proportion to that training, for National Guard and Reserve Forces.

Respectfully submitted,

W. B. BIZZELL,  
W. H. S. DEMAREST,  
SAMUEL AVERY,  
W. E. JOHNSON,  
F. L. McVEY,  
W. M. RIGGS.

*Committee.*

Following considerable discussion as to possible methods of grading institutions having Reserve Officers' Training Corps units into distinguished and other classes, including a statement from Lieutenant-Colonel Gleaves, and several motions offered, amended and withdrawn, on motion, item 5 in the report as presented was not accepted, but in lieu thereof, was substituted the following recommendation:

(5) That it is the judgment of the Executive Body that the War Department by some method satisfactory to itself should determine and designate from 20 to 25 percent of the institutions possessing Reserve Officers' Training Corps units as distinguished institutions on the ground of work accomplished.

On motion, the report of the Committee on Military Organization and Policy, as amended, was accepted and adopted.

Lieut.-Col. S. R. Gleaves, in charge of Reserve Officers' Training Corps activities, then addressed the Executive Body as follows:

[Owing to illness, Colonel Gleaves has been unable to supply a statement for insertion at this point. The following excerpt from Bulletin 9, giving the gist of his talk, is inserted in lieu thereof. EDITOR.]

Colonel Gleaves in charge of R. O. T. C. activities for the War Department stated in essence that in his judgment there was little likelihood that material reduction of the officer personnel detailed to the R. O. T. C. units would be made during the coming year; that apparently there would be a definite allotment of approximately 650 officers; that apparently \$3,100,000 would be available during the present school year for R. O. T. C. purposes; that the usual camps would be held without consolidation; that the R. O. T. C. camps would function as usual by themselves; that for the next fiscal year it was proposed to ask for approximately \$4,196,000, the increase being predicated upon increased enrollment; that there was no immediate likelihood of extension of the present system, no likelihood of an increased number of units; that, on the contrary, such as were clearly inefficient were likely to be done away with; that in general the senior units are favored as compared with junior units; and that it was the point of view of his office that the R. O. T. C. department in an institution should be held to be in all respects on a parity with other departments.

On motion, the thanks of the Executive Body were extended to Lieutenant-Colonel Gleaves for his attendance and helpful address.

#### REPORT OF SPECIAL COMMITTEE ON PAYING EXPENSES OF FACULTY MEMBERS ATTENDING PROFESSIONAL GATHERINGS

The report of this committee was read by President Futrall of Arkansas, as follows:

Early in the year a letter was sent out to all State agricultural colleges and State universities in the United States asking for information about their practice in this matter. Answers received from 61 of these institutions indicate that there is an utter lack of any uniform or definite policy in the payment of such expenses.

In general, it may be said that there appears to be an overwhelming sentiment in favor of paying at least a part of the expenses of some faculty members in attendance on professional gatherings each year. Only three institutions express themselves as being opposed to the practice.

A number of institutions replied that there is a growing sentiment in their States against the expenditure of public money for such purposes. In a few States the matter has been restricted by law, either by limiting the number of persons who may attend any gathering, or by requiring the permission in each case of some State official or State board.

While it is impossible to classify definitely the answers received, the following statement gives a very fair indication of conditions existing:

Nineteen institutions have no settled policy, each case being settled on its merits. In 18 institutions the individual is expected to pay when the trip is taken for his individual benefit. Five pay the expenses of men who take part on the program. In 5 institutions allowances are made for such expenses in the budgets of the various departments. Four institutions pay one-half, and four others pay all of the expenses for one trip each year. This does not necessarily apply, however, to all faculty members. Eight pay the railroad fare of a limited number of faculty members each year. In seven institutions the policy is determined by the amount of available funds.

In at least two institutions the practice is to pay one-half of the railroad and hotel expenses not to exceed \$75 for any one man in any one year.

In January last a questionnaire covering the same subject was sent out by a faculty committee of Swarthmore College to 151 colleges and universities on the accepted list of the Association of American Universities. Answers were received from 116, including 29 State universities and State agricultural colleges. It may be said, in general, that the results of the Swarthmore inquiry were practically the same as the results obtained by your committee, although approximately three-fourths of the institutions from which Swarthmore received answers were not included in the list of institutions interrogated by your committee. The results of the Swarthmore inquiry are published in *School and Society* for March 25, 1922, on pages 337 and following.

The Swarthmore inquiry included meetings attended by administrative officers as well as professional societies. The report states that it seems to be the universal practice to pay expenses due to attendance of administrative officers upon meetings of associations of which the colleges and universities are themselves members. When delegates are sent to represent officially a college or university before a public body, as, for example, a legislature or legislative committee, or at an inauguration, it is also customary to pay expenses. Finally, it is the general practice to pay the expenses of administrative officers (presidents, deans, librarians, etc.) who attend sessions of their professional societies.

In most cases it appears to be the president of the institution, oftentimes with the advice of other officers, who determines whether expenses shall be paid. In a few cases a definite sum for the year is set apart, and the faculty, or a committee thereof, is allowed to determine what members of the faculty shall be allowed to use the money for traveling expenses.

In the ensuing discussion the following points were brought out: That in Massachusetts, under present conditions, if a college employee needs to go beyond State borders on institutional business, even for so short a distance as five miles, he must state in writing the date of and reason for the journey, and its approximate cost; that the statement then travels to a committee of two trustees, thence to the president, thence to the Commissioners of Education, thence to the Governor, thence to the Superintendent of Administration, who, if it has been approved by all these parties, and he himself approves it, starts it back on its return course to the Governor, thence to the president, and thence to its original source; that recently in Massachusetts an entire month's bills for the college amounting to nearly \$70,000 were held up for more than a week because somewhere in the circumlocution office was mislaid a travel request involving out-of-State travel amounting to less than \$1.50; that this strangle hold was the result of junketing and joy-riding on the part of politicians; that the subject with which the report of the special committee deals is to some extent a local issue; that, whereas, in some places there is tendency to abuse of the privilege, in others the institution, because of comparative isolation, needs must be more liberal than those nearer the centers.

In the belief that further study of this matter would be worth while, on motion, the report was accepted as a report of progress and the committee continued.

## REPORT OF THE EXECUTIVE COMMITTEE

The report of the Executive Committee was presented by its chairman President R. A. Pearson of Iowa, as follows:

It is recommended:

(a) That the thirty-seventh convention be held November 13-15, 1923, at Chicago; that the general session and section program plan of the New Orleans and Washington conventions be adopted for the next convention; that all section and sub-section officers be urged to confer concerning programs before they leave the city, and in any event at the earliest possible moment.

(b) That the rule adopted this year as to program issuance 30 days in advance of the convention be adopted permanently.

(c) That manuscripts, etc., pertaining to the present convention, not received by the editor early in December, be omitted from the proceedings.

(d) That every institution holding membership in this association seriously consider its relationship with the Federal Board for Vocational Education in respect to the Smith-Hughes Act as well as its obligations under that Act, and that the position taken at the Springfield (1920) convention touching this matter be reaffirmed as follows:

"That every land-grant college executive should be in a receptive mood; that the institutions as a unit should offer themselves for Smith-Hughes work; that lukewarmness on the part of anyone tended injuriously to affect the interests of all; that outside and antagonistic pressure had been brought to bear against land-grant college interests in this matter; and that a united front was vitally necessary."

(e) That a thorough study be made of the administrative relationships of the land-grant colleges with their respective State governments with special reference to the increasingly frequent adoption of the system of centralized expenditure control, a system which is seriously encroaching upon the authority of the administrative officers of many land-grant institutions.

(f) That, in view of the contemplated reorganization of the United States Department of Agriculture, as set forth at this convention by Assistant Secretary Pugsley, the incoming Executive Committee be requested to take up with the Secretary of Agriculture the matter of resurvey of the present memorandum of understanding concerning cooperative extension work between the land-grant colleges on the one hand and the United States Department of Agriculture on the other, with a view of more adequately covering cooperative relationships between the colleges and the department in respect to research as well as extension.

(g) That association dues be fixed at \$75 for institutions comprising resident teaching, research, and extension; at \$55 for institutions dealing with resident teaching and extension; at \$35 for institutions dealing with resident teaching only; at \$20 for institutions dealing with research only.

(h) That the vacancy caused by the withdrawal of Dean Davenport of the University of Illinois as representative of the association in the American Council of Education be filled, and that a representative for three years be elected.

(i) That a representative of the Association with the National Research Council be chosen for one year.

(k) That, following the example of other associations of collegiate institutions, this Association approve in general the plan of the Committee on Social and Religious Surveys, looking towards the discovery of the influences affecting the religious life of college students, and that this body nominate a representative to serve on an advisory committee touching this matter, without incurring financial obligation.

(l) That the usual dues in support of the American Council of Education, namely \$100, be authorized.

In connection with the approval of the recommendation in item (f) it was brought out as a reason for such resurvey that a tendency was manifest to enter into agreements with State departments of agriculture for work along research lines. It was thought desirable to make a clear differentiation between administrative investigations which lie within the proper field of work of State regulatory departments and research conducted for the specific purpose of the advancement of knowledge.

On motion, the recommendations in items (a) to (l) inclusive were adopted.

On motion, President K. L. Butterfield of Massachusetts was chosen to fill the vacancy created by the withdrawal of Dean Davenport of Illinois, and President R. A. Pearson of Iowa was chosen representative for three years with the American Council of Education; President A. F. Woods of Maryland was chosen representative of the Association with the National Research Council; and President K. L. Butterfield of Massachusetts was chosen to represent the Association on the advisory committee in relationship to the Committee on Social and Religious Survey.

#### SALE OF LIBERTY BONDS

On motion, the treasurer was authorized, in his discretion, to sell the Liberty Bonds in his charge owned by the Association.

#### FUTURE CONVENTIONS

On motion, it was voted to meet in Chicago in 1923, and in Washington in 1924 and in even years thereafter; the meeting in every case to be in as close and convenient time and place juxtaposition as practicable with the meeting of the National Association of State Universities.

#### RECOMMENDATIONS OF STANDING COMMITTEES

##### INSTRUCTION IN AGRICULTURE, HOME ECONOMICS AND MECHANIC ARTS

The recommendations as made (see pp. 81-82), on motion were accepted and adopted.

##### EXPERIMENT STATION ORGANIZATION AND POLICY

The recommendation as made (see p. 159), on motion, was accepted and adopted.

##### EXTENSION ORGANIZATION AND POLICY

The recommendations as made, other than that dealing with transportation (see pp. 218-222), on motion, were accepted and adopted. The recommendation touching transportation, on motion, was referred to the special committee, consisting of Presidents Futrall, Hetzel, and Kinley (see p. 364).

In connection with this report the opinion was vouchsafed that it covered the extension field excellently well.

#### PROJECTS AND CORRELATION OF RESEARCH

The report was read and received as information.

#### ENGINEERING EXPERIMENT STATIONS

The recommendations as made (see pp. 274-275), other than item 1, on motion, were accepted and adopted. On motion, item 1, as stated, was rejected and in lieu thereof, on motion, the sum of \$600 was appropriated for the purpose set forth in the first paragraph of item 1. The report then, as amended, was accepted and adopted.

#### CONCERNING PRESIDENT DEMAREST

On motion, the secretary was requested to convey to President W. H. S. Demarest of New Jersey, seriously ill at his home, the sympathy of the association and its best wishes for his speedy recovery.

#### CONCERNING THE STATUS OF PAST PRESIDENTS

On motion, it was voted that it was the sense of the Executive Body that at future conventions the privileges of the floor at all general sessions should be extended to all past presidents of the association, who for any reason are ineligible to act as delegates, and that the secretary, prior to each convention, should express in writing to each such past president the hope of the Executive Body that he would be able to attend and participate in the deliberations of the association.

#### REPORT OF THE EXECUTIVE COMMITTEE

The chairman in some detail went into the situation created by virtue of the suit brought in the United States Supreme Court by the Commonwealth of Massachusetts against the Secretary of the Treasury and others, with the views of testing the constitutionality of the Sheppard-Towner Act. He pointed out the possible relationship of this suit to the various measures in which the land-grant colleges are interested. It was further pointed out that it was not unlikely that legal talent would have to be secured and a brief prepared, in which event a more or less heavy draft upon the association treasury would have to be made.

After discussion, on motion, it was voted that the Executive Committee be authorized, if in its judgment it seemed necessary, to secure the preparation of a brief, to cooperate in this matter with other national organizations which may be interested and to increase the dues levied against the institutions for the coming year, as provided under item (g) of the report of the committee (see p. 366) to the extent not to exceed 20 percent.

#### REPORT OF THE AUDITING COMMITTEE

The committee on auditing the accounts of the treasurer reported that it found the accounts and statement of the treasurer in all respects correct (p. 40).

## REPORT OF THE NOMINATING COMMITTEE

The nominating committee, consisting of Presidents Kerr, Lory, and Butterfield, reported as follows:

President: President Howard Edwards of Rhode Island.

Vice-President: Dean E. A. Burnett of Nebraska.

Secretary-Treasurer: Dean J. L. Hills of Vermont.

Executive Committee: Presidents R. A. Pearson of Iowa, W. M. Riggs of South Carolina, A. F. Woods of Maryland, Deans A. R. Mann of New York, and F. B. Mumford of Missouri.

On motion, the secretary was instructed to cast, and did cast, the ballot of the association for the persons above named.

## PROPOSED CONSTITUTIONAL AMENDMENTS

Following discussion touching the advisability of making the president of the Association *ex-officio* a member of the Executive Committee and of limiting the term of service of members of the Executive Committee, two proposed amendments to the Constitution were submitted, as follows:

By President W. B. Bizzell of Texas:

*Present form:* Duties of officers. (2) The President shall deliver an address at the general convention before the Association in general session.

*Proposed form:* (2) The President shall be *ex-officio* a member of the Executive Committee during his term of office, shall fill vacancies as they occur on all standing committees, and appoint all special committees unless otherwise provided for by the Executive Body, shall preside at the meetings of the Executive Body and the general sessions, and shall deliver an address at the annual convention before the Association in general session.

*Present form:* Rules of order (8). Vacancies which may arise in the membership of standing committees by death, resignation, or separation from the association of members shall be filled by the committees respectively.

*Proposed form:*

By President W. E. Johnson of South Dakota:

*Present form:* Officers. (3) An Executive Committee of five members shall be chosen by the Executive Body, of which Committee three members shall be chosen from the Executive Body and the remainder at large.

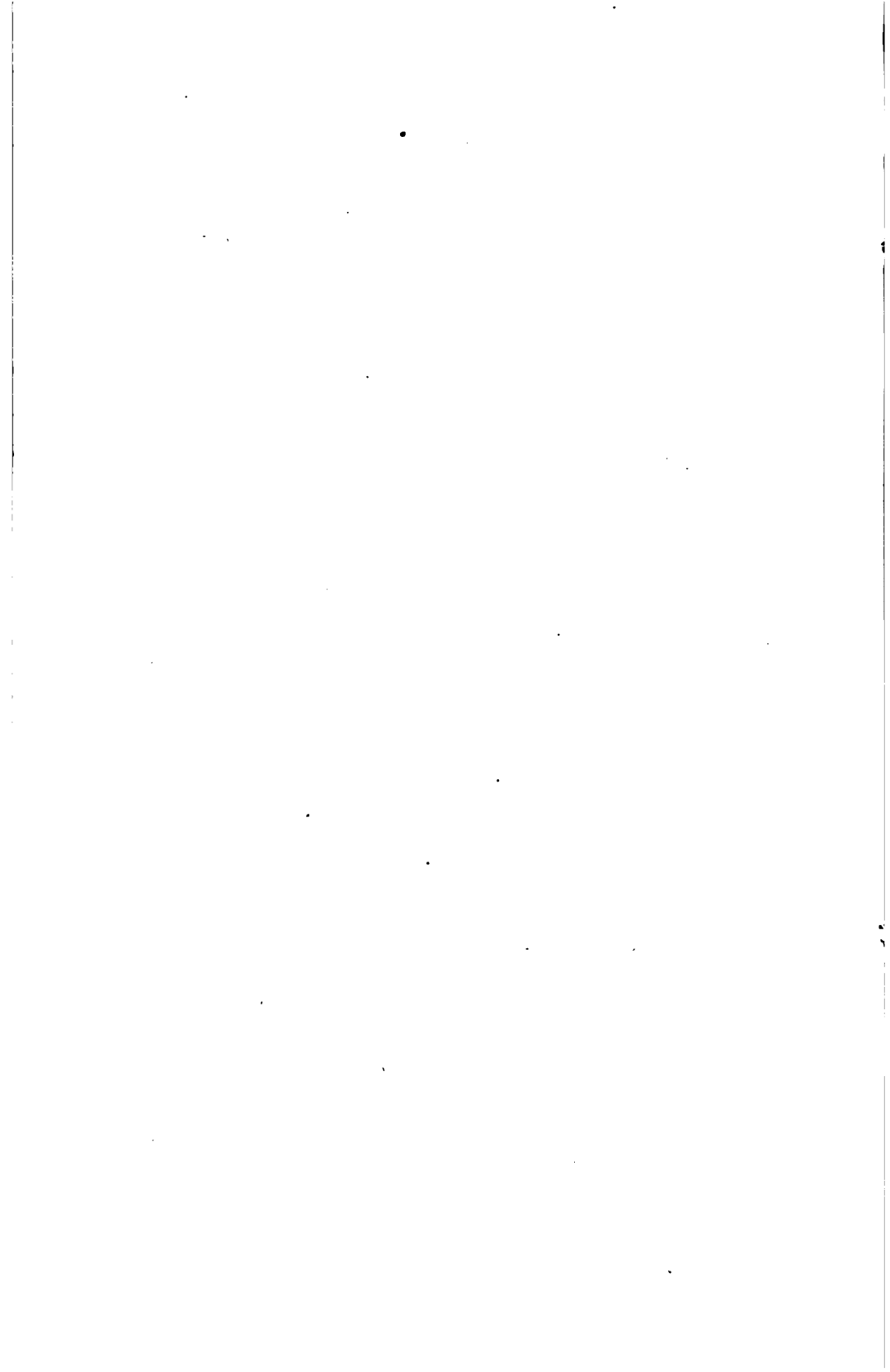
*Proposed form:* (3) *Add:* The term of members shall be five years, one such term expiring each year, the member whose term thus expires being ineligible for immediate re-election.

## CONCERNING THE 1923 PROGRAM

On motion, the incoming Executive Committee was asked in its formulation of the program of general sessions of the next convention to stress the engineering phases of land-grant college work.

On motion, the Executive Body adjourned *sine die*.





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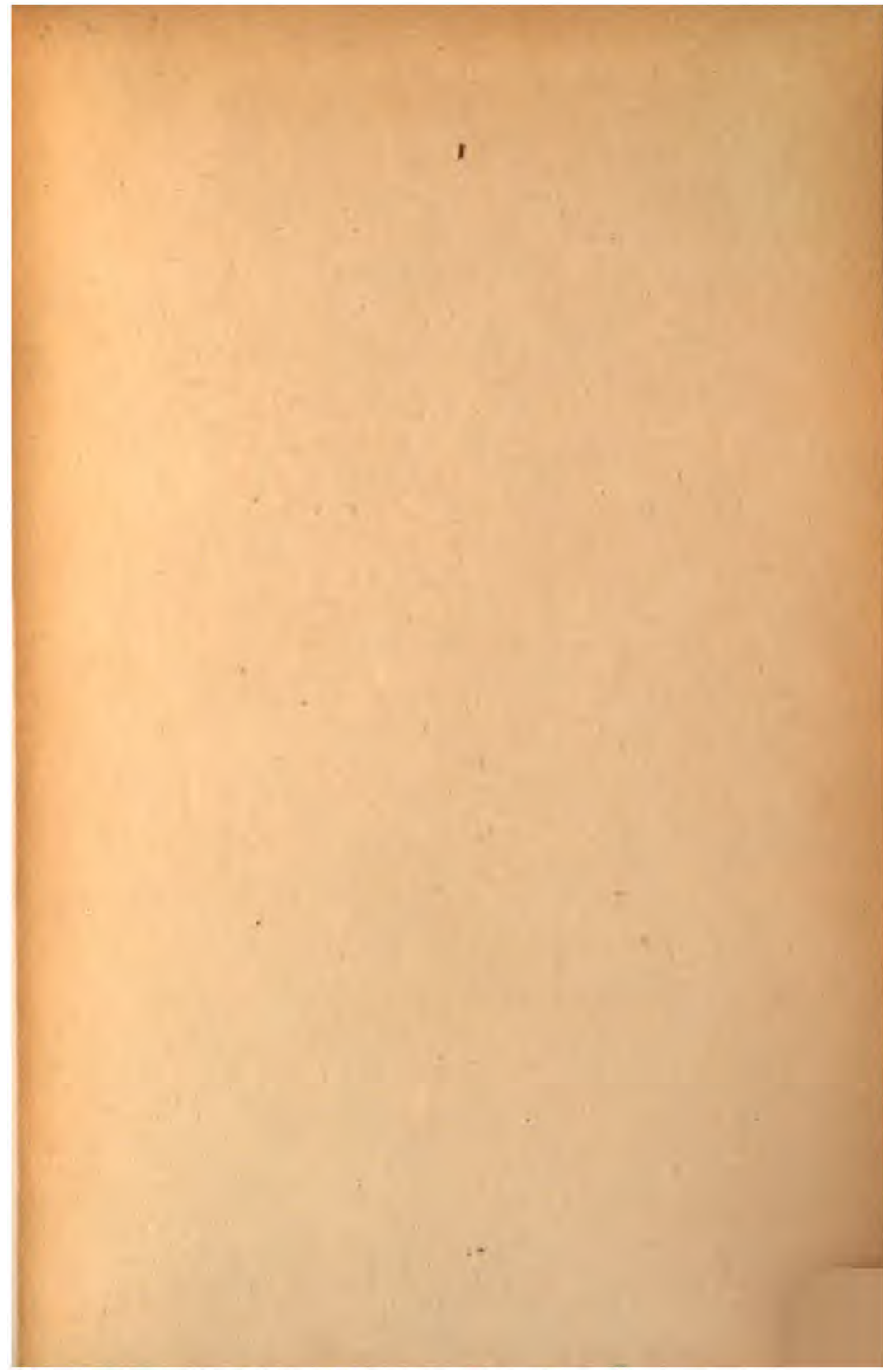
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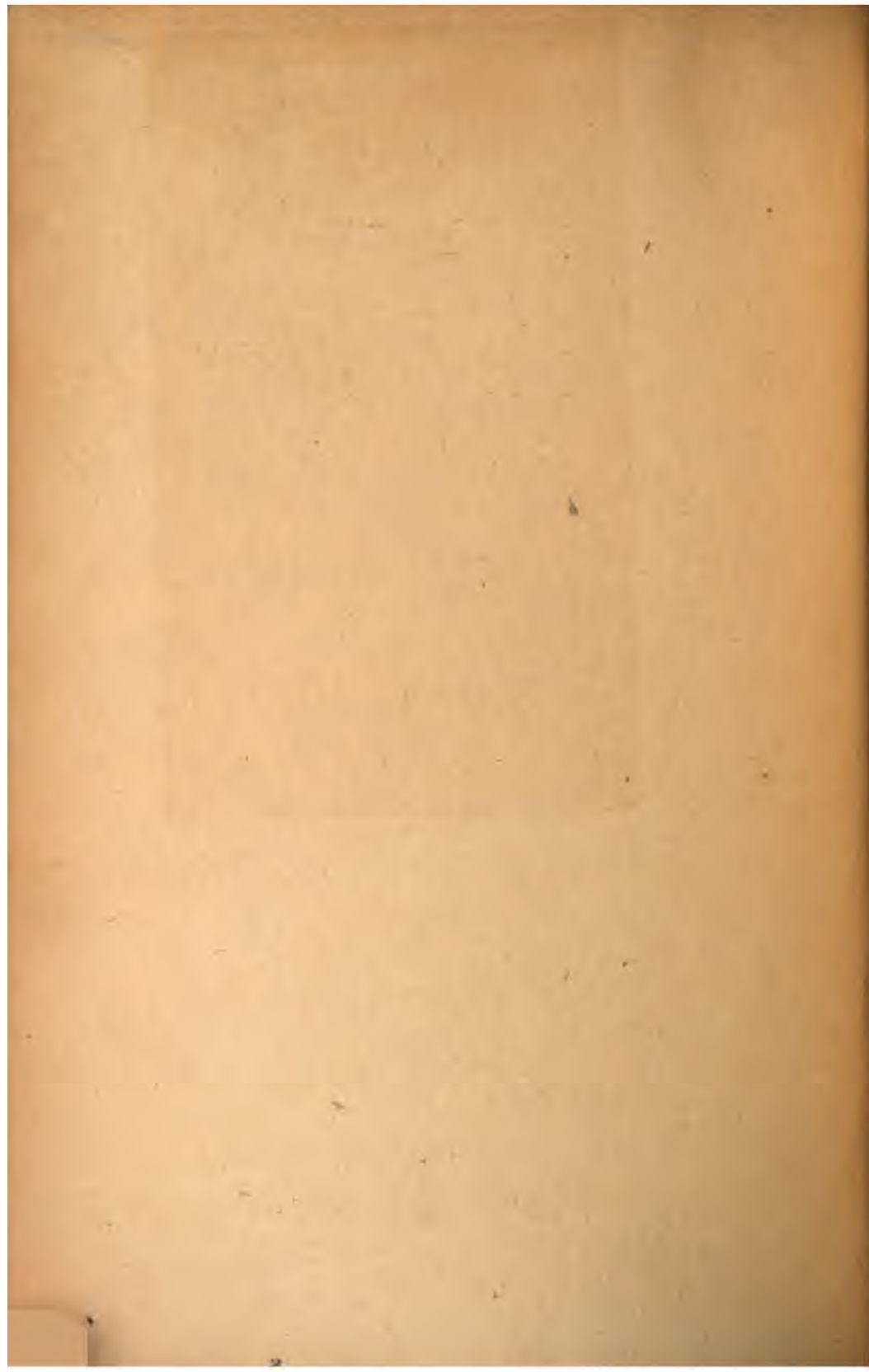
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